TECHNOLOGY DEPT.

SEPTEMBER, 1950

Telephone Engineer and Management

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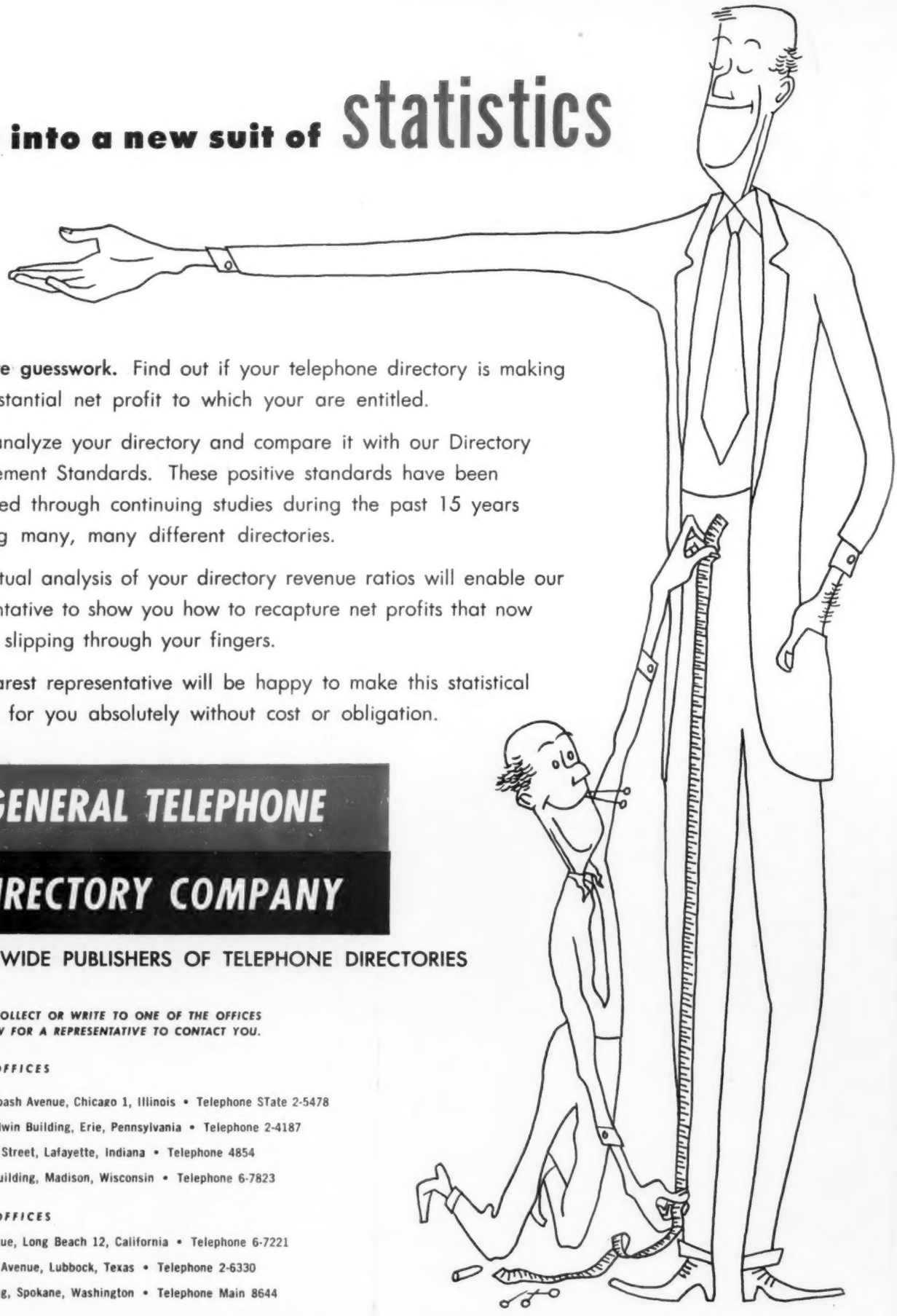
DETROIT

THE NATIONAL TELEPHONE MAGAZINE

Features In This Issue —

- Protect & Improve Customer Service—*By H. G. Turner*
- Wintertime Maintenance—*By John S. Reed*
- Modern Testing Procedures—*By B. C. Burden*

Slip into a new suit of statistics



Eliminate guesswork. Find out if your telephone directory is making the substantial net profit to which your are entitled.

Let us analyze your directory and compare it with our Directory Measurement Standards. These positive standards have been developed through continuing studies during the past 15 years involving many, many different directories.

This factual analysis of your directory revenue ratios will enable our representative to show you how to recapture net profits that now may be slipping through your fingers.

Our nearest representative will be happy to make this statistical analysis for you absolutely without cost or obligation.

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NATIONWIDE PUBLISHERS OF TELEPHONE DIRECTORIES

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assure positive operation of telephone equipment

Exide-Manchex Batteries are different. Their famous Exide manchester positive plates are unique in design and construction, and are used *exclusively* in this outstanding storage battery. Other important features include: slotted plastic separators, impervious to chemical and electrical reaction; plastic spacers that maintain perfect plate alignment; the latest development in molded glass jars; heavy terminal posts with copper insert for extra conductivity. Combined, these features assure dependable power for positive operation of telephone equipment.

Use Exide-Manchex Batteries for all stationary battery requirements—common battery, emergency reserve, signaling, PBX and other applications. Their use is assurance of dependability, long life and low cost maintenance.

THE ELECTRIC STORAGE BATTERY COMPANY
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Exide Batteries of Canada, Limited, Toronto

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1888 . . . DEPENDABLE BATTERIES FOR 62 YEARS . . . 1950

Across The Editor's Desk

Congratulations are due to HARRY BATES, president of the Dixon (Ill.) Home Telephone Company, on the accomplishments of his company. Dixon, 100 miles west of Chicago, has more telephones per capita than any other in the United States. On the midnight of July 29 a new automatic system of 2900 lines was cut in replacing manual equipment. A new nine position toll board was also cut in to service. Harry, an outstanding sales minded executive, is also president of the Illinois Telephone Association.

• • •

A luncheon for Mr. MAX McGRAW, chairman of Central Electric & Gas Co. and Central Telephone Company and Affiliated Groups, celebrating his completion of 50 years of service to his companies was given by Mr. JUDSON LARGE on July 31. Mr. McGraw started the McGraw Electric Company Aug. 1, 1900 at Sioux City, Ia. That company now has assets of $35 million. Many congratulatory telegrams and messages to Mr. McGraw marked the occasion. An illuminated scroll signed by about 25 friends and business associates present at the luncheon was presented Mr. McGraw.

• • •

Thanks to J. I. KENNEDY & B. R. ANDERSON and their associates of the Northwestern Telephone Company, Freeport, Ill., for the wonderful party extended to their supplier friends on July 25 at the Freeport Country Club. Starting with luncheon and golf the climax of the party was reached at the chicken dinner and entertainment. Andy distributed prizes to the lucky golfers and served as co-host to Mr. Kennedy, president of the company.

• • •

Of special interest to management and students of management is the article in this issue by ALBERT W. KIMBER. His article "The Markets For New Capital" is one of the best of several he has authored exclusively for TELEPHONE ENGINEER Publications. Turn to page 47 to start.

The National Telephone Magazine

TELEPHONE ENGINEER and MANAGEMENT

SEPTEMBER, 1950 **VOL. 54, NUMBER 9**

Editor, RAY W. SMITH • *Advertising Director*, ROY F. SMITH
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FRONT COVER

Hundreds of jobs had to be planned when Pacific Telephone & Telegraph Co. started its project by burying 589 miles of coaxial cable between Sacramento and Portland. Our cover photograph shows one phase of the job—plow train moving along the plain north of Montague. The four tractors give a good idea of what it takes to pull a plow point through five feet of earth.—*(Courtesy Pacific Telephone Magazine.)*

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WHEREVER YOU USE WOOD..

IN THE DESERT, crossties broom, shatter and split from extreme dryness and heat. Solutions made with BARRETT* Coal-Tar Creosote retard this, and also reduce mechanical wear of crossties through their lubricating action on the wood fibers. In poles, heavy treatment with BARRETT Coal-Tar Creosote substantially reduces checking and splitting.

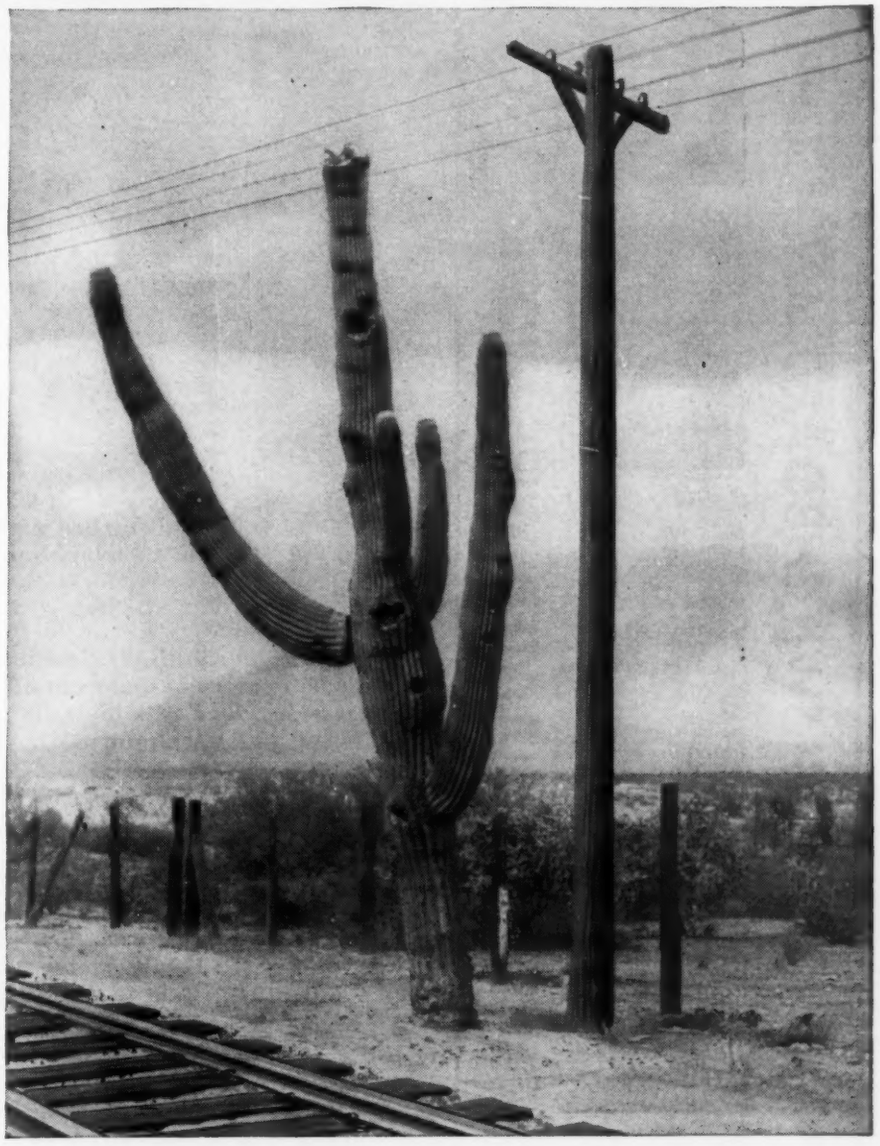
IN THE NORTH, poles must resist the tremendous weight of frequent sleet storms. Avoid preservatives which *weaken* the wood. BARRETT Coal-Tar Creosote allows poles to retain their maximum strength, and helps to keep the poles at their best and hold the lines aloft.

IN THE SOUTH, prolonged high temperatures cause light-bodied preservatives to leach and evaporate from the wood, thus exposing the wood to termite attack and decay. BARRETT Coal-Tar Creosote, heavier bodied and of lower volatility, prevents this condition. It stays in the wood longer under all conditions—doesn't "run out" on the job.

IN THE SWAMPS, forces of decay are almost at their maximum of destructive power. High moisture content and infection from other decaying wood and debris are ever-present menaces. Poles properly treated with BARRETT Coal-Tar Creosote have survived under swamp conditions for years.

IN FRESH WATER, many preservatives leach out of wood. BARRETT Coal-Tar Creosote resists this leaching action. Being only negligibly soluble in water, it is the preferred preservative for use on submerged wood structures, or those exposed to the powerful action of rapidly flowing water.

IN SALT WATER, marine wood-borers give a preservative its severest test. Of hundreds of preservatives that have been tried through the years, *Coal-Tar* Creosote is the only one that has proved consistently effective against teredos, limnoria and other salt-water enemies of wood.



THE BARRETT DIVISION
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Use Barrett* →

Reg. U. S. Pat. Off.

Only coal-tar creosote wood preservative has been used long enough and widely enough to have proved its effectiveness under all conditions.

COAL TAR CREOSOTE

DISTRIBUTED BY KELLOGG SWITCHBOARD AND SUPPLY COMPANY

DROP • ENDURPRENE • BRIDLE

MANUFACTURED BY GENERAL INSULATED WIRE WORKS, INC., PROVIDENCE, R.I.

Revenue Boosters

By Richard Allen

"FAMILY AFFAIR" . . . Telephone service is a family affair. It should be planned to give the utmost pleasure and satisfaction to every member of the subscriber's family. Here are some of the ways auxiliary equipment makes your subscriber's telephone service complete, brings added enjoyment to everyone in the home, and gives your company revenues a boost.

(1) *Extension Telephones For Convenience:* Step-saving extensions cost your subscribers only pennies a day . . . less than the daily paper. An extra telephone is a big help in kitchen or utility room, an added pleasure in den or recreation room and a real protection at the bedside.

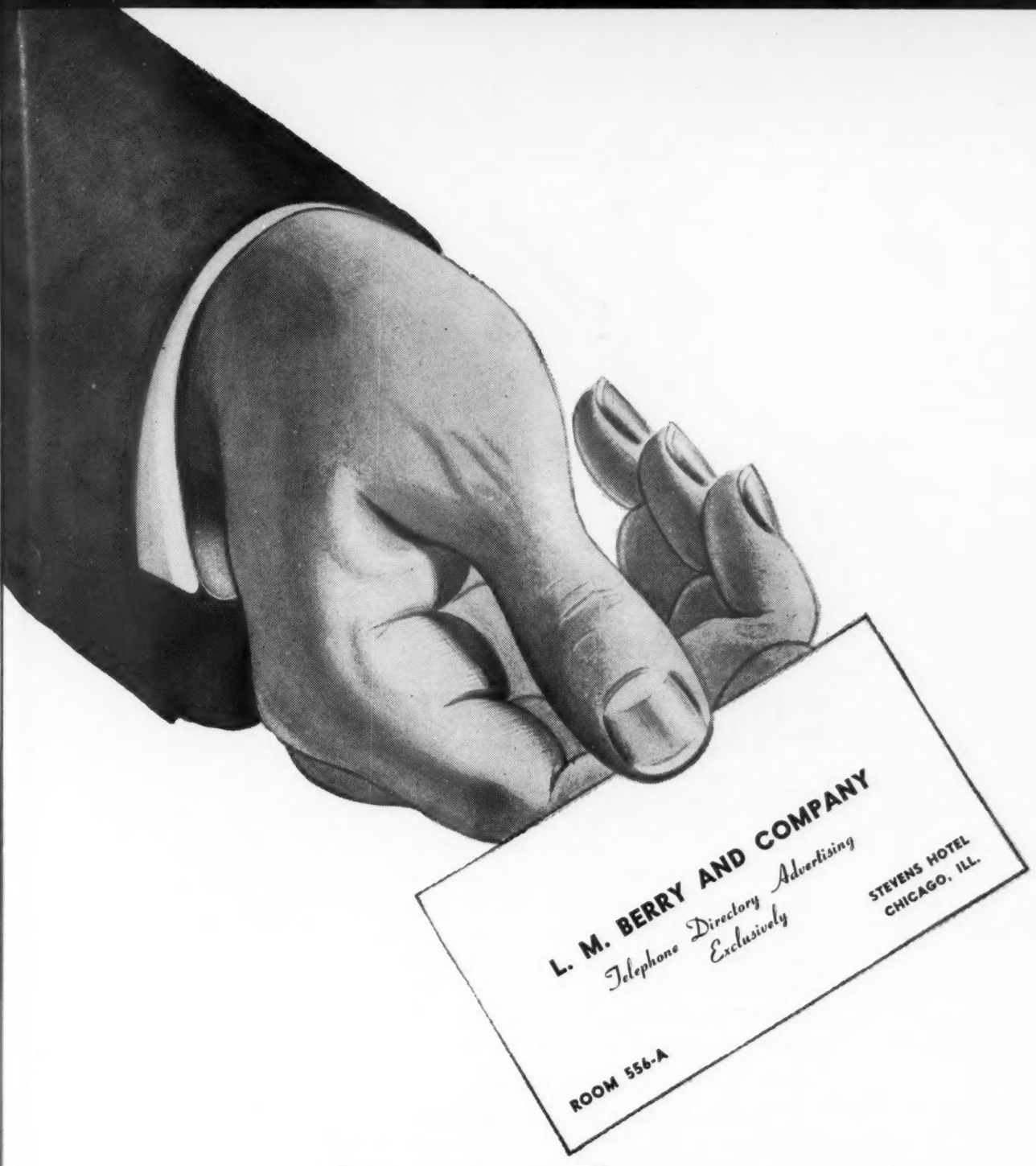
(2) *Cut-Off Keys For Peace And Quiet:* A cut-off key makes it possible for the subscriber to have a bedside telephone available yet completely silent when he needs quiet for a nap, an undisturbed night or a sickroom. A neat button in the telephone base turns the bell on or off.

(3) *Extension Bells:* Inside or outside, extension bells and auxiliary cut-off keys make sure your subscriber gets his calls when out of earshot of his telephone . . . in the yard, for instance.

(4) *Plug-In Extensions:* Your subscriber can carry his telephone service from one room to another when he has jack-and-plug equipment. One portable telephone serves several locations. It is plug-ended and fits into the special type jack pictured.

(5) *"Hard-Of-Hearing" Sets:* The tiny inconspicuous button on this instrument opens up a new world of telephone pleasure for those whose hearing is impaired. A turn of the button steps up the volume.

(6) *Additional Listings:* Your subscriber can list other members of his household in the telephone directory for a small additional monthly charge. These extra listings make it easier for friends to find the family and they help to provide complete service on incoming calls.



You are cordially invited to attend our exhibit at the U.S.I.T.A. Convention

OUR POLICY: The largest amount of advertising revenue consistent with maintaining the best public relations with subscribers.

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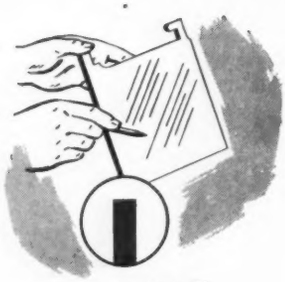
13 BRANCH OFFICES: Birmingham, Alabama • Bristol, Chattanooga, Memphis and Nashville, Tennessee • Harrisburg, Pennsylvania • Jackson, Mississippi • Louisville, Kentucky • Milwaukee, Wisconsin • New Orleans, Louisiana • Rochester, New York • Tampa, Florida • Warsaw, Indiana

Berry Representatives Sell Advertising for more Telephone Directories than any other Company



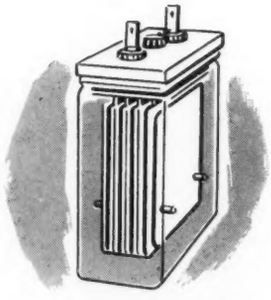
Positive plate is pure antimony-free lead of highest metallic purity and electrical efficiency.

"Here's Why GOULD PLANTÉ Lasts Practically Forever!"

Positive plate is grooved to give highest amount of active material per square inch of plate surface.

Gould Planté Batteries remain in active, continuous, full-float service for 20, 30, even 40 years because Planté positive plates contain only pure lead—not antimony. There can be no antimony carry-over to contaminate negative plates. They float at constant voltage, maintain rated capacity all their life.

GOULD PLANTÉ
The Aristocrat of Stationary Batteries!



Large acid space means fewer water additions, lower maintenance costs, minimum servicing.

GOULD

STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC.*

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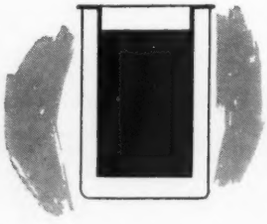
Always Use Gould-National Automobile and Truck Batteries

*Formerly Gould Storage Battery Corporation



Planté is strongest of all stationary batteries. Entire cell suspended from jar. No cover sag. No cover lift.

NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*
ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS *on Alternate Weeks*

September 15, 1950

Dear Sir:

Georgia Public Service Commission approved Danielsville & Comer Tel. Co. (recent recipient of REA loan authorization) request for boosting rural multi-party residence rate to flat base rate of $3.00 per month & rural multi-party business rate to flat rate of $4.00 per month. John Birchmore, company pres., testified REA had expressed preference for flat rural rates. He also said it was his understanding subscribers located beyond normal distances from base rate areas would be required to contribute to cost of construction of telephone lines. Commission order approved application but commented "in general, this commission does not approve of flat rural rates."

* * *

Behind recent incorporation of Treasure State Utilities Corp., Absarokee, Mont., is interesting story of group effort to obtain capital necessary to remodernize telephone system. Jack Fink, pres., Stillwater (Mont.) Junior Chamber of Commerce & Roy C. Gurley, pres., Absarokee Tel. Co., originally took over task of interesting private capital in project. Money stayed in bank vaults & away from company's checking account. With private capital prospects keeping hands tight on wallets, company took its story to REA's telephone loan department. Although loan is under consideration & approval is expected at early date, company kept up its efforts to locate private capital & found money could be secured from sources not previously contacted. Through bond issue of $100,000 which has been taken up by midwestern interests, & sale of authorized capital stock consisting of $100,000 common & $5,000 preferred, new company is off to good start.

* * *

Our sectional correspondents who keep up on telephone developments in their assigned areas are flooding our news' editor's desk with reports indicating greatly increased activity in formation of new telephone co-ops. Here's summary of reports. . . . Northeastern Montana Tel. Co-op, organized at Plentywood, Mont. George Johnson, Reserve, Mont., is chairman. This co-op expects to incorporate for $1,000,000 & be one of largest telephone co-ops in USA. . . . Arne Goplen, Kingsley, N. D., named

chairman of Rural Telephone Committee considering formation of new co-op. . . . Wells County Tel. Co-op organized at Heaton, N. D. Peter Friezen, Cathay, N. D., is chairman.

Kidder County Rural Tel. Assoc. organized at Steele, N. D. John Gilk, Dawson, N. D., is chairman. . . . Silas Hillestad, Williston, N. D., is chairman of Williams Tel. Co-op., Inc., which plans to establish automatic central offices in 9 towns in Williams County, N. D. . . . Upper Grand River REA, Bison, S. D., reports formation of telephone group to provide telephone service to 1,500 subscribers. Until telephone unit is completely organized, officers & directors of Upper Grand River REA will be in charge of activity. John Riedy, Bison, S. D., is pres. of REA group. . . . C. H. Getty, REA representative, Washington, D. C., visited board meeting of Sneedville (Tenn.) Tel. Co-op & explained provisions of REA's rural telephone loan program. He stated new co-op must have 450 members. This initial number of members would authorize REA to send engineers to survey project, he said. C. M. Collins, Sneedville, Tenn., is pres. of co-op.

* * *

HIGHLIGHTS:--Inter-Mountain Tel. Co. started $150,000 expansion project at Bristol, Tenn. . . . Conestoga Tel. & Tel. Co. completed $50,000 automatic conversion at Sassamansville, Pa. . . . P. Schenkburger elected sec.-treas. of new Emmons County Rural Tel. Co-op., Linton, S. D. . . . James Valley Tel. Co. organized at Forestburg, S. D. . . . J. S. Lunn, Winner, S. D., is sec. of group considering formation of new rural telephone co-op to serve rural areas around Winner. . . . Citizens of McClain County, Okla., considering formation of rural telephone co-op. George Haxel, Purcell, Okla., is temporary chairman of project. . . . Emerson Liechty, pres., Harrison Tel. Co., Clay City, Ind., announced REA had acknowledged receipt of company's loan application. . . . Dr. J. J. Crouch, pres., South Central Tel. Co-op, Glasgow, Ky., announced co-op's telephone program was reviewed by J. W. Bauler & C. H. Goetting of Washington, D. C. . . . Now is time to make room reservations for USITA Convention, Oct. 9, 10,11, Hotel Stevens, Chicago.

West Coast Tel. Co., Everett, Wash., completed purchase of Telephone Service Co., Kirkland, Wash. West Coast company paid $514,852 for company's stock. Roy E. Edfast appointed commercial supv. of new properties. . . . Rural Tel. Co-op being organized to serve Fulton County, Ill. Sid Smith, Abingdon, Ill., is pres. . . . George Henry purchased Macedonia (Ark.) Tel. Co. from Dale Nipper. . . . Harry Cribbs purchased Kaleva (Mich.) Tel. Co.

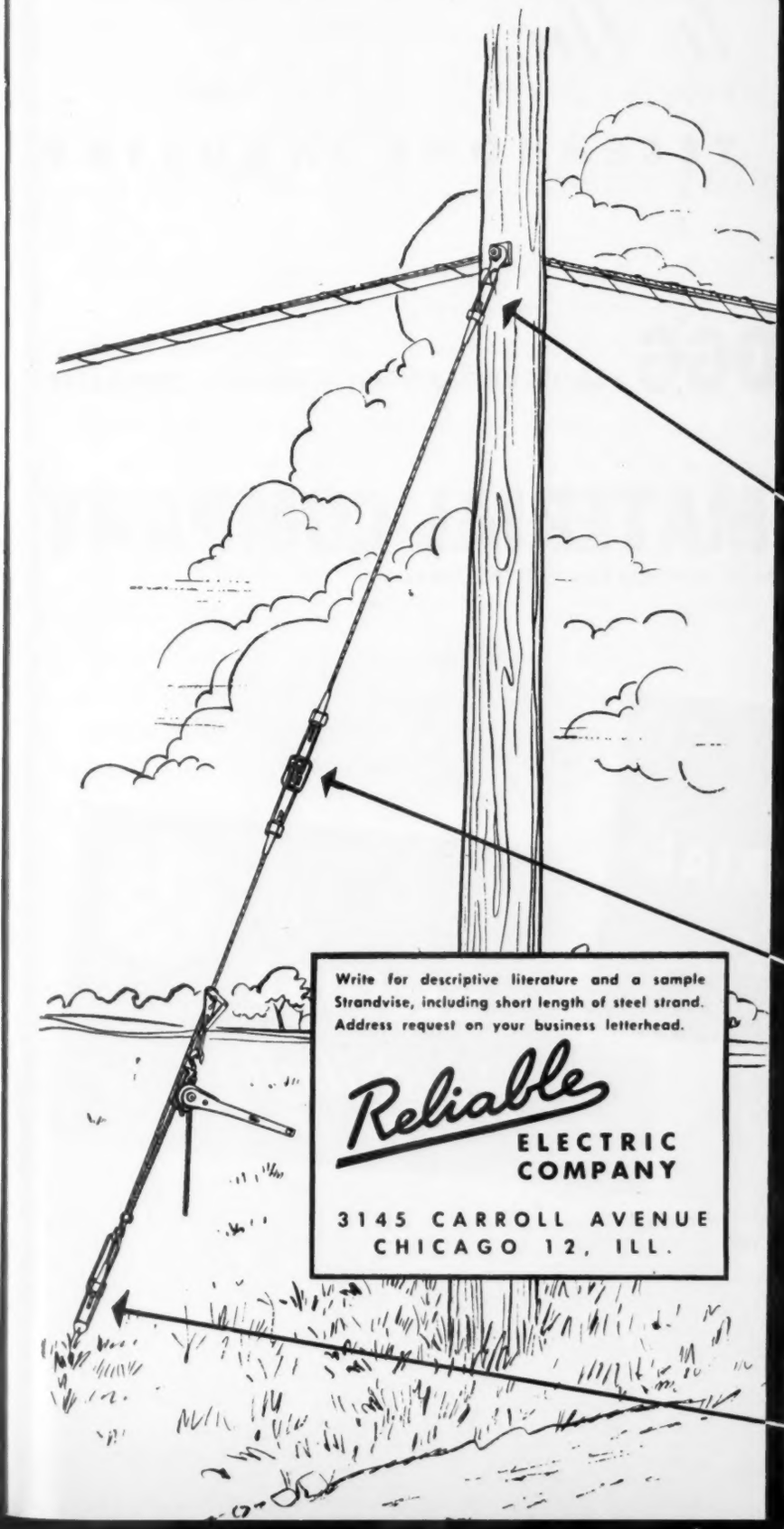
Ray Smith

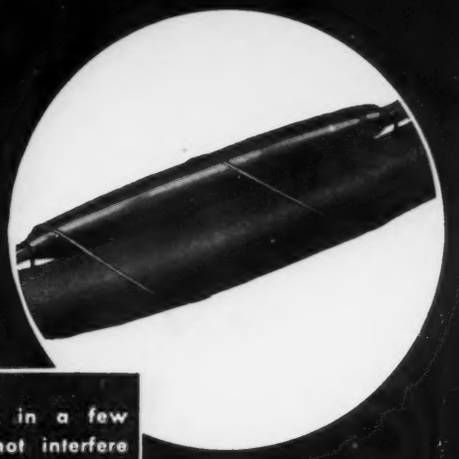
Ray W. Smith, Editor

Handles Steel Strand Easily

STRANDLINKS for Splicing
STRANDVISES for Deadending

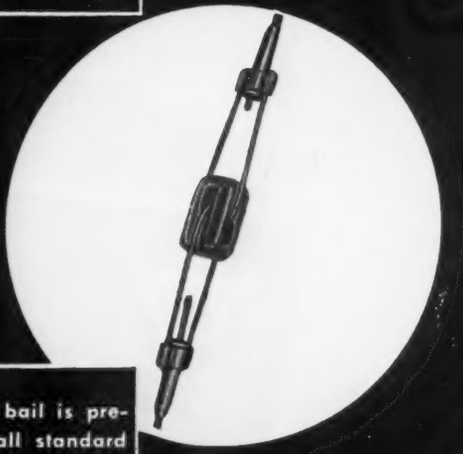
Develop *ultimate* strength of any grade steel strand.



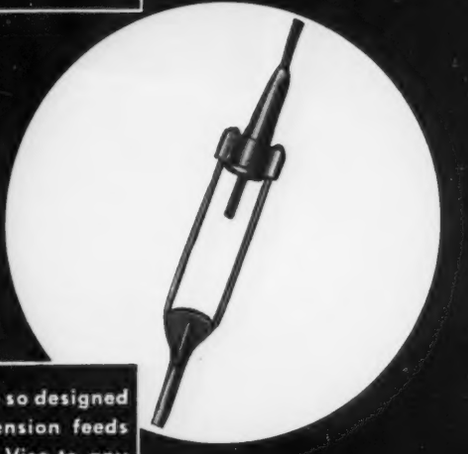


Splices, made in a few seconds, do not interfere with spinning machines.

Strandvise with Stainless Steel (type 304) bail eliminates looping and clamping. Saves strand and saves time.



Stainless steel bail is preformed to fit all standard porcelain strain insulators.



Strandvises are so designed that applied tension feeds strand through Vise to any desired tension.

Write for descriptive literature and a sample Strandvise, including short length of steel strand. Address request on your business letterhead.

Reliable ELECTRIC COMPANY

3145 CARROLL AVENUE
CHICAGO 12, ILL.

A Special Announcement to the

INDEPENDENT TELEPHONE INDUSTRY

by the **KELLOGG** SWITCHBOARD AND SUPPLY COMPANY

and the **LINE MATERIAL COMPANY**

(A McGRAW ELECTRIC COMPANY DIVISION)

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becomes the Principal Distributor

for LM Line Construction Materials

to the independent telephone industry

For more than fifty years a big percentage of America's leading Independent Telephone Companies has chosen KELLOGG as its buying source for dependably excellent telephone equipment of every kind.

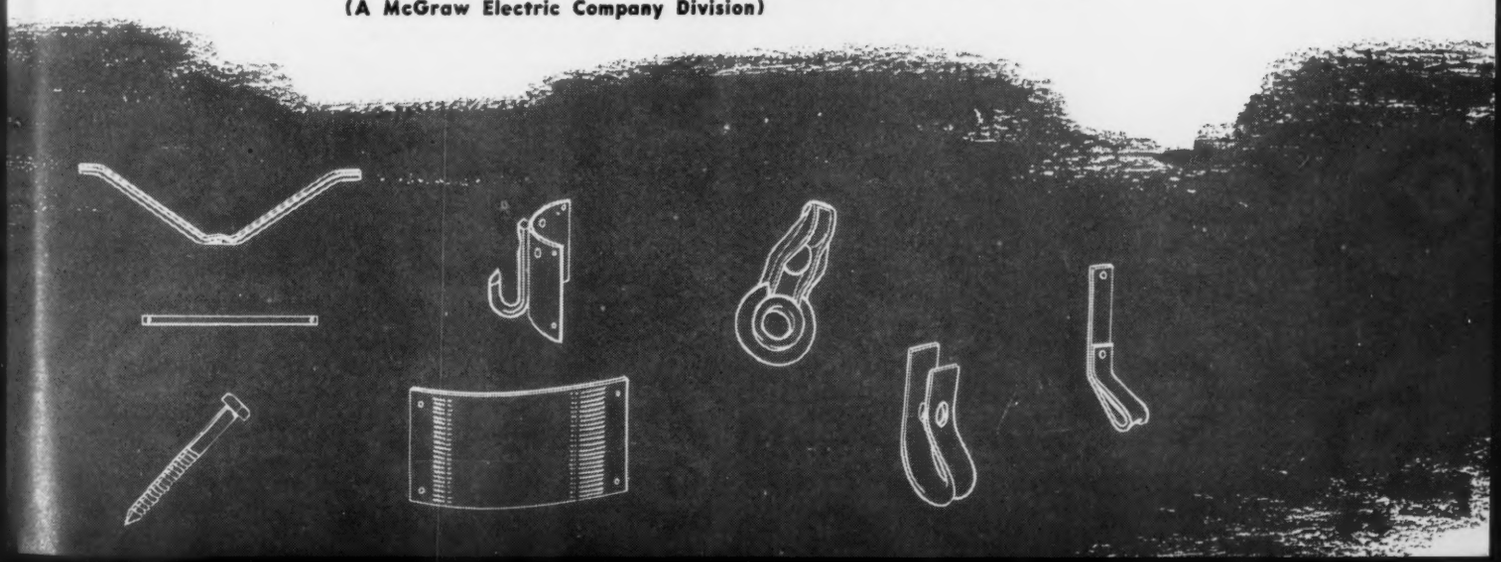
Similarly, for almost four decades, LINE MATERIAL COMPANY has been known for line construction material built to the highest specifications of the industry. The L-M trademark has become a symbol of progressive engineering, research and manufacture serving the advancement of the telephone and electric power industries.

The KELLOGG Company and LINE MATERIAL Company are therefore proud to announce their association, by which KELLOGG becomes the principal distributor of L-M Line Construction Materials to the independent telephone industry. The full facilities of the two companies can thus be made available to the Independent Industry through the KELLOGG Sales Organization.

We look forward to working more closely than ever before with the Independent Telephone Companies—through the most comprehensive and practical buying-aid service it is possible to provide.

KELLOGG SWITCHBOARD AND SUPPLY COMPANY
6650 South Cicero Avenue, Chicago 38, Illinois

LINE MATERIAL COMPANY • Milwaukee 1, Wisconsin
(A McGraw Electric Company Division)



Welcome!

to the

KELLOGG Exhibit

Rooms 501-501A-502

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USITA National Convention

Stevens Hotel

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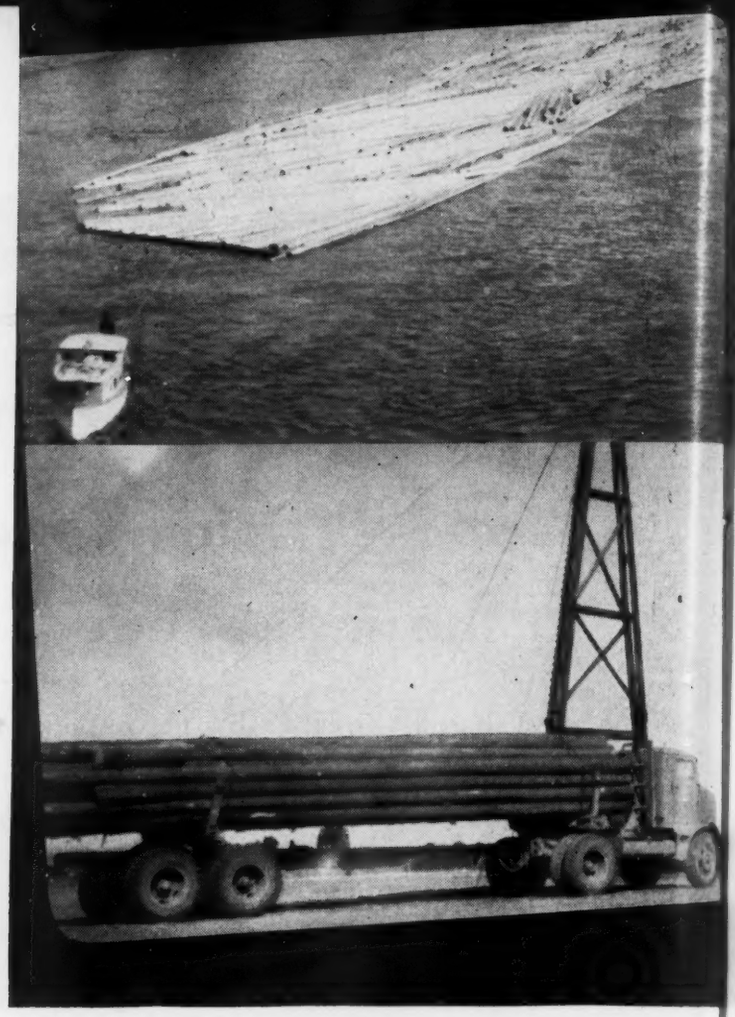
October 9, 10, 11



Famous for Strength and Durability, Northern White and Western Red Cedar poles flow toward the MAC GILLIS & GIBBS CO. plants in a steady stream, by water, truck and rail. There they're processed and creosote-treated to insure longer service life. Order MacGillis & Gibbs poles next time and watch your replacement costs drop!

Get Maximum Battery Performance by choosing Gould Planté and Floté Batteries exclusively. They're built specifically for full float service over amazingly long periods of time. Telephone men everywhere find they cut maintenance and replacement costs to a minimum. Manufactured by GOULD STORAGE BATTERY CORP. Write for details.

for EASIER ORDERING PROMPT HANDLING QUICK SHIPMENTS

...send your next order to KELLOGG

When you order from Kellogg, you fill out just ONE order form for *all* your line supplies. Saves you time and work! Then your order gets prompt attention by experienced telephone men. No chance for slip-ups here! Finally, we ship quickly, from the distribution point nearest you. It's fast, sure service, and every item is *guaranteed!*

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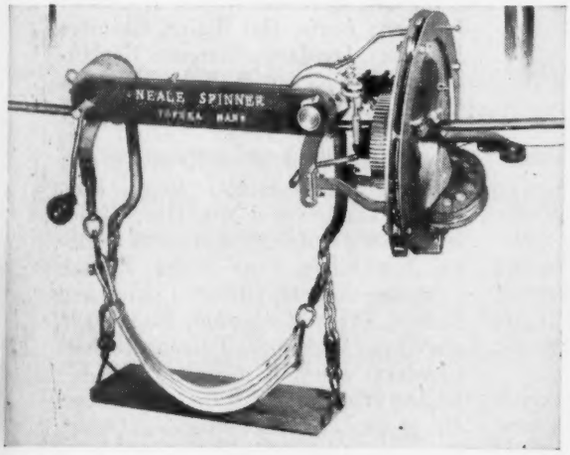
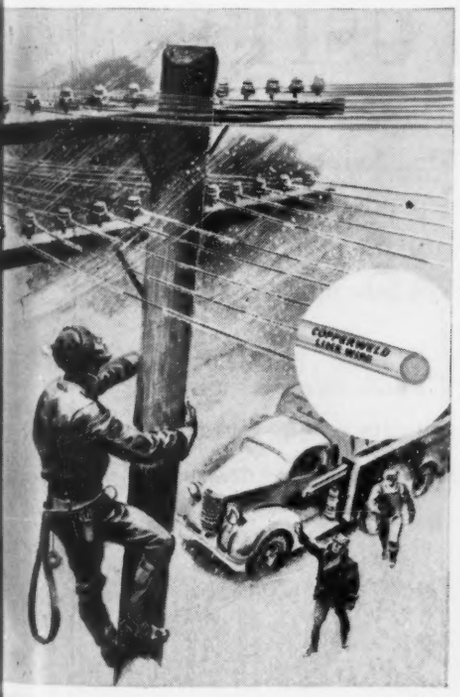
ALL OF THE ABOVE ITEMS MAY BE QUICKLY AND CONVENIENTLY ORDERED FRO HE KE

Drier Than the Driest Desert! For safe, easy drying of splices in lead-covered cables, sprinkler Drierite Dessicant among the conductors. Drierite granules make splices the driest part of the cable. This W. A. HAMMOND DRIERITE CO. product won't harm conductors or insulation.

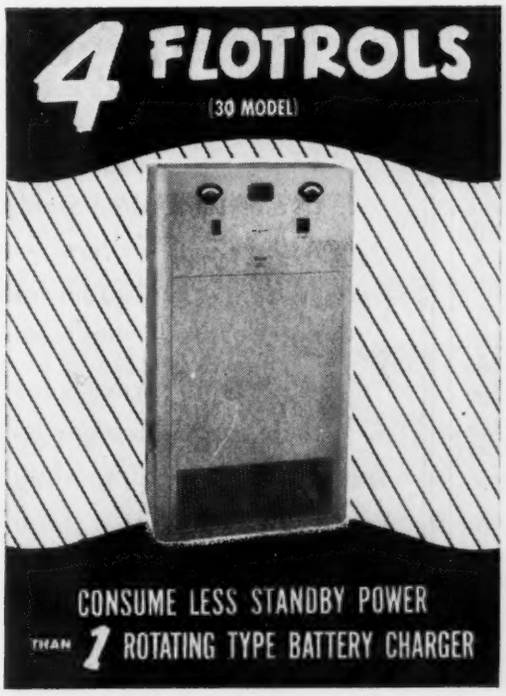


Longer Cable Life and Less Maintenance results from spinning with the Neale Model "B" Cable Spinner. Designed for one-man use. May be operated by hand crank or pulled along from the ground. Made by CABLE SPINNING EQUIPMENT CO., its accessories include storage chest, seat and safety belt.

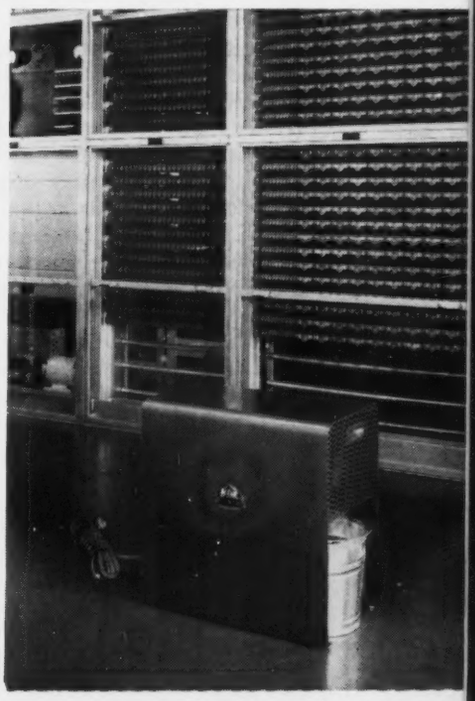
Sealed Against Trouble! Manufacturers of communication equipment insist on Kester Plastic Rosin-Core Solder, because it makes a perfect seal. Eliminates high-resistance joints and intermittent open-and-closed circuits. Protect against trouble by using KESTER SOLDER COMPANY's Plastic Rosin-core throughout your system.



Weather Hazards are not problems when you use Copperweld Line Wire. Thick copper covering resists corrosion. Alloy steel core permits longer spans and provides strength to withstand heavy ice and wind loads. This long-lasting wire is made by COPPERWELD STEEL CO.



Substantial Power Savings assured by this constant voltage battery charger. 4 Flotrol Chargers consume less standby power than 1 rotating type. Saves on installation and maintenance. Maintains close voltage regulation under heavy load. Made by LORAIN PRODUCTS CORP.



Remove Excess Moisture From Air in Dial Offices. Keep relays dry with an Oasis Air Drier. Quickly connects to any electrical outlet. No valves or thermostats to adjust. Easy to move, attractively finished—costs but a few cents a day to operate. Made by The EBCO MANUFACTURING CO.

REA Officials Check Thompson, Ia., Application

According to the *Forest City, (Ia.) Summit,* realization of a new rural telephone system in Winnebago County, Ia., came a step closer upon the arrival at the Winnebago REA office, Thompson, Ia., of four REA officials from Washington, D. C., to re-check all aspects of the loan application recently sent to Washington. The Washington officials were J. Ernest Hartz and R. M. Hyle, loan appraisers; and John Buscemi and K. W. Benckert, telephone engineers.

Also working with the REA staff, in the interests of the Winnebago Rural Telephone association, is Ray Williamson, REA field engineer, who is checking clearances on existing REA poles to determine the feasability of placing telephone lines on these poles. V. H. Lobaugh of Des Moines has been working with the REA throughout the summer as consulting telephone engineer.

Application for the Winnebago Rural Telephone Association loan, amounting to $452,000, was mailed to Washington last June. It represents the estimated cost of constructing new lines rehabilitating existing lines needed to consolidate 43 small telephone companies into the Winnebago RTA system.

If the loan is approved, the new telephone system to be established will link 2,235 rural and small community telephone users in the Winnebago REA area, with the service available to another 613 prospective users.

Subscribers will be provided with the latest type of dial telephone service, with a separate switching unit for each of nine local service areas —centered around Forest City, Leland, Crystal Lake, Lake Mills, Joice, Scarville, Thompson, Buffalo Center and Rake.

Rural Group Formed At Forestburg, S. D.

At a recent telephone meeting held at Forestburg, S. D., the James Valley Telephone Co. was organized.

After the company was organized, Maurice Erkkila, State REA Field Representative, outlined the procedure that is to be followed. Mr. Erkkila told the group that the first step is to secure signatures of those interested in having telephone communication established under a set-up that is similar to REA. A sign-up fee of $5.00 is requested with the application. After the sign-up is complete and the cost of supplying all the members is determined, an additional amount, not to exceed $45, is requested. According to Mr. Erkkila this total cost of not to exceed $50 includes telephone completely installed.

Board members of the James Valley Telephone Co. are: Floyd Noble, Art Hallander, Vernie Thompson, Harlan Payne, Alvin Larimer and Raymond Judy.

New Co-op To Serve Wolfe County, Ky.

Solicitations have started in Wolfe County for the Mountain Co-op. Telephone Corp., Compton, Ky. Potential subscribers are being asked to deposit $25.00 which will be refunded if the proposed telephone service does not become a reality.

Members of the organizing committee are: *Valeria,* Roy Kash and Jack Center; *Maytown,* Wilbur Wilson and Dorsie Lane; *Toliver,* Scott McGuire and Willard Ingram, *Hazel Green,* Dorsie Rose and H. A. Sovall; *Daysboro,* Joe Nickell and Cecil Rose; *Gilmore,* Sebe Ferguson; *Helechawa,* Pearl Gullett and Mrs. Bob Rose; *Lee City,* Kelse Risner, Ova Davis, and J. C. Barfield; *Rosefork,* Raymond Shockey and Jesse Risner; *Belknap,* Orban Rudd and Ollie Lindon; *Burkhart,* Harry Risner; *Lacy Creek,* Bob Robinson, Blair Childers and Joe B. Hughes; *Treut,* Jim Brown, Charlie Brewer and Buford Brewer; *Stillwater,* Kelly Rose, John Buchanan, Mrs. Albert Elkins and Jesse Johnson.

Baptist, Emerson Wells, J. Dalton Johnson; *Lexie,* Jim Blaine, Childers Johnson; *Landsaw,* Clarence Cockerham; *Bethany,* Miss Burt; *Malaga,* D. C. Rose and Mrs. L. Combs; *Campton,* Mrs. James Cable, Mrs. Nora Clark and Miss Reva Terrill; *Vortex,* Seldon Cable; *Mary,* Mrs. Bishop Taulbee and Mrs. Hazel Bradley; *Sandy Ridge,* Red Roberts; *Bear en,* Jim Allen; *Pine Ridge,* Ramah Johnson; *Rogers,* Hobart Lykins and Robert Tyra; *Zachariah,* Edd Bush, and Isaac Whisman; *Torrent,* Garrett Childers; *Fork,* R. Childers and Joe Miller; *Calaboose,* Floyd Byrd and H. Rose, and *Hollonsville,* Dewey Tyra and Ollie Miller.

Greetings to USITA

UPON THE OCCASION of the 53rd Annual Convention of the United States Independent Telephone Association, Federal congratulates this distinguished organization for its continuing record of noteworthy accomplishments.

Federal cordially invites USITA members and their friends to enjoy its hospitality rooms and to visit its operating exhibit during the Convention.

FEDERAL TELEPHONE & RADIO FTR An IT&T Associate

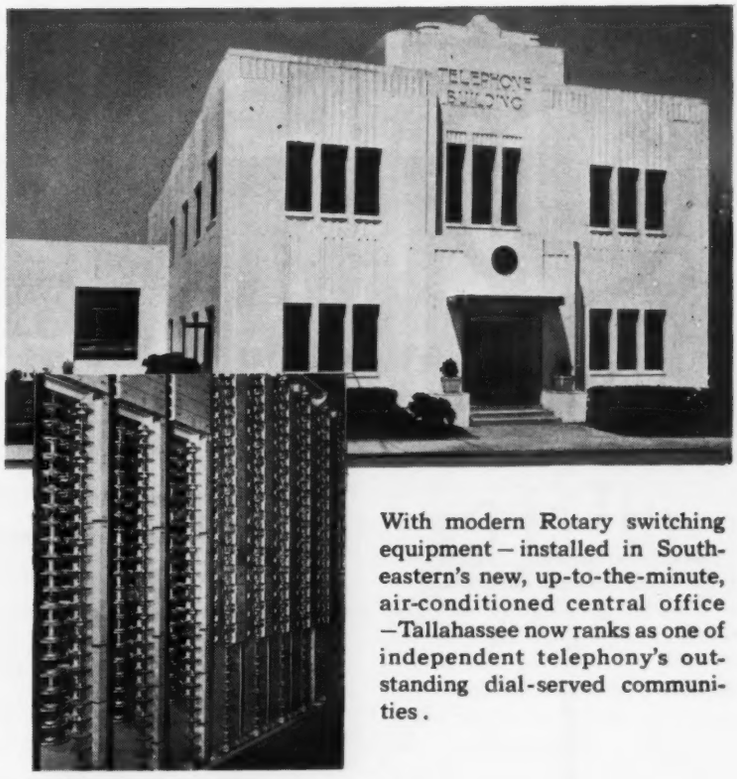
Federal Telephone and Radio Corporation

Tallahassee converts to *Federal* Dial Switching Equipment

Southeastern Telephone Company's exchange in Florida's Capital City now served by 6,000 lines and 8,900 terminals of Federal's 7A-2 Rotary Dial Switching System.

A NEW ERA of telephone service was opened to Tallahassee subscribers on August 26, when Southeastern Telephone Company, an affiliate of Central Telephone Company, completed a full-sweep change-over to Federal Rotary Dial Switching.

Especially designed to meet the city's requirements of today, and to provide for operating needs of tomorrow, Tallahassee's new system is one of the most advanced of its type in service anywhere.



With modern Rotary switching equipment — installed in Southeastern's new, up-to-the-minute, air-conditioned central office —Tallahassee now ranks as one of independent telephony's outstanding dial-served communities.

Federal Offers Attractive Delivery Dates on its Complete line of Telephone Equipment, including:

★ Rotary and Step-by-Step Switching Systems ★ Private Automatic Branch Exchanges
★ Telephones ★ Toll and Test Boards ★ Carrier Systems
★ Various Types of Test and Associated Equipment

For details on any size exchange, write to Telephone Sales Department

Federal Telephone and Radio Corporation

FEDERAL TELECOMMUNICATION LABORATORIES, Nutley, N. J. . . . a unit of I T & T's world-wide research and engineering organization.

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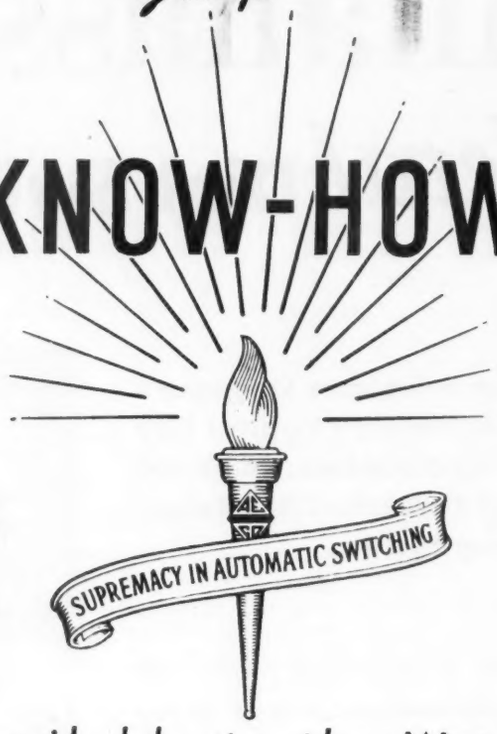
"KNOW-HOW"



Available to the World

Whenever you may wish—wherever you may be—the facilities and "know-how" of these four outstanding manufacturing companies are available to you. **First,** to provide a sound basis for consulting with you on your problems—and **then** to supply you with the equipment and material you need.

Through its offices and representatives in all parts of the world, the International AUTOMATIC ELECTRIC Group brings to your problems the experience it has gained by working with and for hundreds of telephone companies and operating administrations. That same "know-how" is applied also to the manufacture of exchange equipment, telephone instruments, wires and cables, and other apparatus—all of finest quality.

For the finest in engineering, manufacture, and installation—for a single exchange or a network, simply address:

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INTERNATIONAL AUTOMATIC ELECTRIC SALES CO., S. P. A.
Via di San Basilio 41, Rome, Italy

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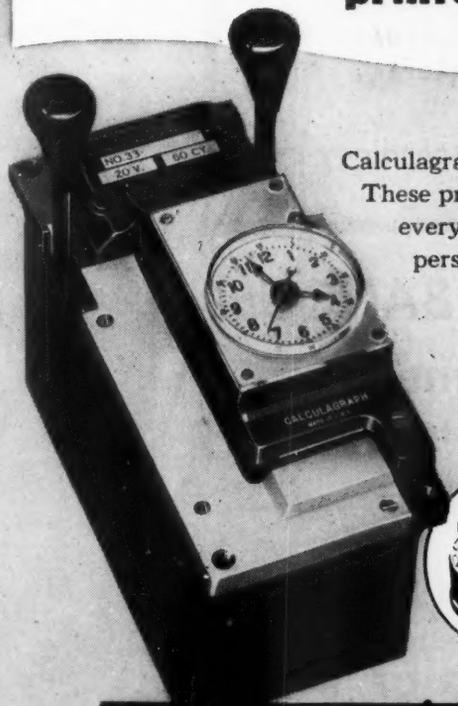
AUTOMATIQUE, ELECTRIQUE, S.A., Antwerp, Belgium
AUTELCO MEDITERRANEA, S.A.T.A.P., Milan, Italy

and other manufacturers
Selling Companies and Agents Throughout the World

If your toll call revenues depend on PENCIL work!

CALCULAGRAPH

is one sure way to collect all the revenue due with accurate, automatically calculated, printed toll time records



Calculagraph printed elapsed time records are accurate to the second. These precise printed records assure collection of all the revenue due every toll call. Automatically computed, they relieve switchboard personnel of time-consuming detail work that slows switchboard service. Calculagraph is the engineered, revenue-vital equipment that no exchange—large or small—can afford to overlook. Available for switchboard or portable mounting, they are fully described in four illustrated catalogs. Write for yours, now, on company letterhead.

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OPERATES SILENTLY

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THE UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

53rd ANNUAL CONVENTION

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OCTOBER 9-10-11

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ANNUAL MEETING OF INDEPENDENT TELEPHONE PIONEER ASSOCIATION

THE UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

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One of the "60" series of Automatic Electric Paystations ready to increase your earnings.

Every gasoline filling station in your territory is a source of potential extra telephone revenue. You can get this added income by installing paystations wherever these opportunities occur—on the highways, in business districts or in neighborhood areas. There is an Automatic Electric paystation to meet every requirement. Postpay or prepay models in wall type, shelf type or the "60" Series booth type will soon pay out their initial cost. Thereafter, for every paystation location you have secured, you are assured steady, constant extra income. Get the details on the entire line of Automatic Electric Paystations; ask for Catalog No. 4078A.

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insist on a proved wood preservative!

When you treat poles and crossarms with creosote oil, you're using a product with records of satisfactory performance that go back nearly a century. You *know* the protection that creosote oil gives under all kinds of service conditions.

And for the finest results from creosote oil treatment, be sure that U·S·S Creosote Oil is used. You'll find no batch-to-batch variation in quality in U·S·S Creosote Oil, for it is the product of continuous processing in the world's largest tar distillation plant.

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EDITORIAL

Construction And New Products Are Twins

IT IS NOT by happenstance that we have linked together in this issue the subjects of Construction and New Products.

It is an integral part of the history of the telephone industry that new and better ways of doing things in the business have greatly influenced telephone construction. No other great nation-wide industry surpasses the telephone industry in the constant creation of new things and new methods for use in the industry, and the improvement of the old.

It has been said that most of the telephone plant in this country has been torn down and rebuilt a dozen times, since the inception of the business, in the interest of progress and improved telephone service.

We do not know of any industry in which the principal managements are more alert to finding and introducing new and better ways of doing things in all departments of the business, and particularly in construction.

That has been particularly true in new telephone construction since the end of World War II—and what a job of construction that has been!

Take the matter of exchange construction and extension, for which accurate data is available. At the end of 1945 there were about 27,900,000 telephones in service in the United States. At the end of 1949—four years later—there were about 40,700,000 telephones. There was a net increase of almost 3,200,000 telephones a year during those four years.

Now, you don't install almost 13,000,000 additional telephones without a lot of construction. And even this tremendous expansion of exchange service does not include the vast amount of new toll facilities that were built during that same time.

Some telephone men feel that, even with the large number of held orders for telphones still waiting to be filled, the necessity for the use of strategic materials and of manpower in the military mobilization program now under way, will—for a time at least—reduce the amount of materials and manpower for telephone construction.

That is of course possible. But in a partial mobilization there should be much more material and manpower available for civilian use than was available during the fighting period of World War II. And, even during that war, in the four years from the end of 1941 to the end of 1945, new telephones were installed at the rate of more than 1,000,000 a year.

Many experienced telephone men expect the demand for additional telephone exchange service to remain high. They also consider it practically certain that the demand for toll service, now the highest ever, will actually increase.

There is, therefore, still a tremendous job of new construction ahead of telephone companies. To help make it the most modern and efficient type of construction possible, is the aim of this "Construction & New Products" issue of this magazine.

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What's true of Automobiles is true of Dial Systems, too!

EVERYBODY WANTS WHAT'S NEWEST AND BEST!

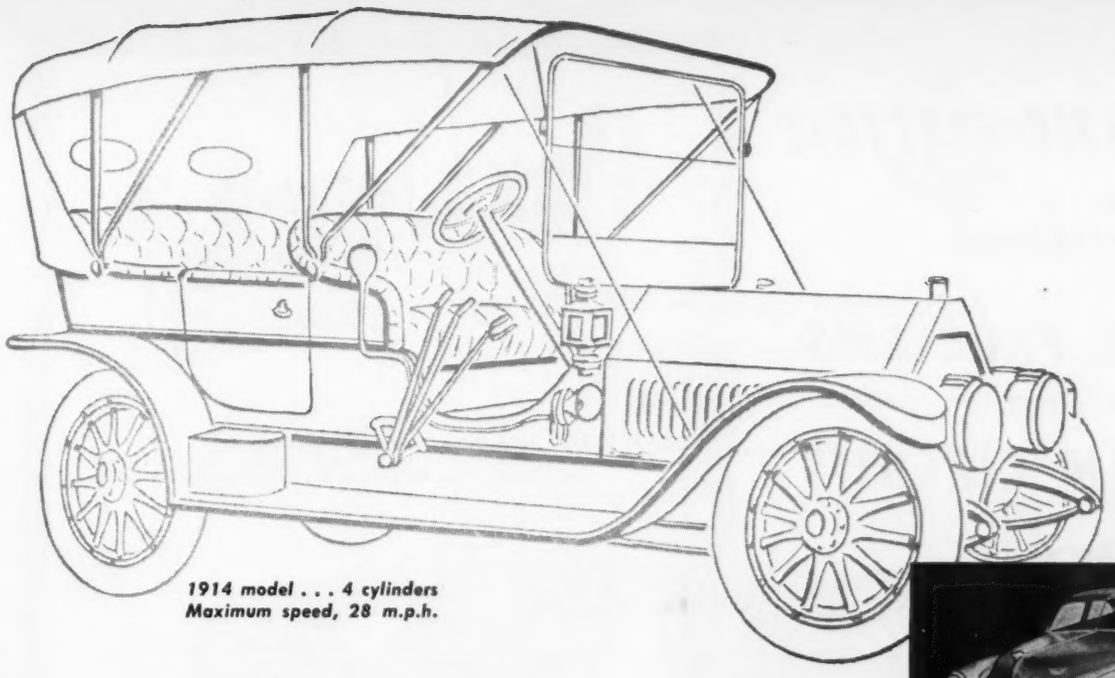
Excellence in any form of manufacturing cannot be based on age alone. The best-made, best-selling cars on the road today bear names that were entirely unknown when the Peerless, the Marmon, the Locomobile and the Stutz were tops.

It's much the same with telephone equipment —especially *dial* equipment. Stromberg-Carlson entered this field later than some manufacturers, but the acceptance and the proved performance of its XY Systems (50 exchanges now in service!) have already given it first rank. The universal XY Switch, "A" Relay and bare Wire Bank arrangement have outmoded old systems as surely as the dashboard starter button has replaced the hand crank.

If dial service is in your future, check with the leader—Stromberg-Carlson.

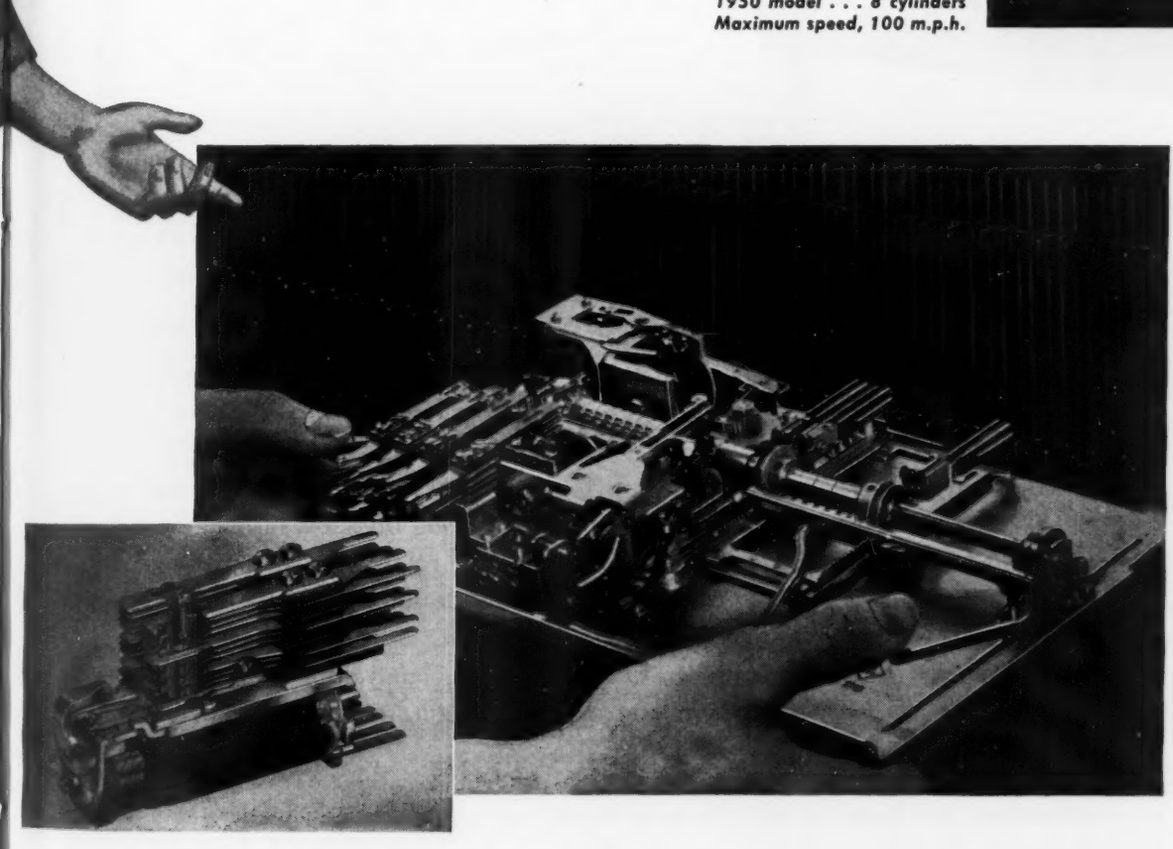
STROMBERG-CARLSON

Factory, General Office Rochester 3,



1914 model . . . 4 cylinders
Maximum speed, 28 m.p.h.

1950 model . . . 8 cylinders
Maximum speed, 100 m.p.h.



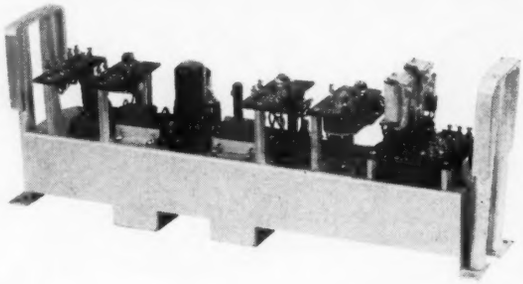
STROMBERG-CARLSON XY...The Newest Dial System in America... **AND THE BEST!**

Rochester 3, N. Y. Branch Offices: Atlanta 3, Chicago 6, Kansas City 8, San Francisco 3. In Canada: Stromberg-Carlson Co. Ltd., Toronto

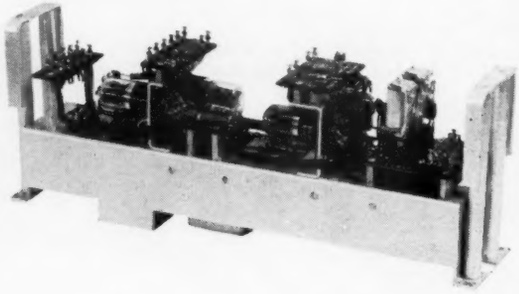
AUTOMATIC ELECTRIC *Solves*

CIRCUIT PROBLEMS and PROBLEM CIRCUITS

with *Lenkurt* "PERFORMANCE-ENGINEERED" CARRIER SYSTEMS



Type 440A Pulse Transmitter provides full-duplex operation of up to 18 dialing channels when used with the **Type 444A Pulse Receiver** (below).



Lenkurt Carrier systems provide really economical use of your outside plant by providing as many as 12 talking paths and associated dialing channels over ONE pair of wires!

But suppose you need automatic dialing channels for your present physical, phantom or carrier circuits? Automatic Electric solves that problem too! With the Lenkurt Type 440A Pulse Transmitter and Type 444A Pulse Receiver (shown above) you can gain up to 18 two-way dialing channels on one carrier voice channel. These dialing channels will be substantially unaffected by heavy power exposures since lines are relatively noise-free at carrier frequencies. And they'll eliminate erratic pulsing often caused by earth currents on ground-return dialing legs. Thus, Lenkurt Carrier provides the most modern, most versatile method of gaining dependable, low cost dialing channels—so good they meet all requirements for inter-toll dialing.

Whether you need voice channels or dialing channels, OR BOTH, use Lenkurt "Performance-Engineered" Carrier, available from Automatic Electric. Just put your problem in our hands.

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Washington Bureau Reports

REA ADVISES it intends to consider rural telephone loan applications in the order in which they are received . . . Carl Brorein, Tampa, Fla., heads USITA National Defense Committee.

By ROLAND DAVIES and FRED HENCK

INDEPENDENT telephone companies have been given another green light to take stock of their loan needs for expansion and improvements in the advice of *George W. Haggard*, Acting Administrator of the Rural Electrification Administration, to U. S. Independent Telephone Association President *Harold V. Bozell* by letter that applications of existing telephone systems, both commercial and cooperative for rural telephone construction loans, will receive REA consideration and action with a continuing preference beyond the first-year priority. This priority was to expire Oct. 28.

Unless some telephone companies in the Independent field are to suffer the plight of World War II, with shortages of materials and manpower to make them vulnerable to criticism that they had not given full effort to their rural programs, it is viewed that they should promptly give careful study to what they can undertake in the way of an REA telephone loan program in the light of present conditions and in view of curtailments in materials which appear to lie ahead in the immediate future.

The REA Acting Administrator, in his recent letter to Mr. Bozell with regard to the Federal agency's telephone loan program, advised the USITA president that it was the REA's intention in administering the rural telephone loan program to adhere scrupulously to this intent and provision of the rural telephone legislation of giving preference to existing telephone systems for loans.

The REA also plans to continue its practice "generally" of considering applications in the order in which they are received, Mr. Haggard wrote. Mr. Bozell had asked the REA to have all applications of Independent companies, filed up to Oct. 28, processed before cooperatives' applications are processed under the statute's priority to telephone companies.

Apropros of the future picture of possible government restrictions in the telephone field in the light of international developments, a special National Defense Committee of the USITA has been named by Mr. Bozell, to be headed by President Carl D. Brorein of the Peninsular Telephone Co. of Tampa, Fla. An outstanding group of eight other leaders in the Independent telephone field comprise the membership of the committee.

Duties of the USITA committee include analyzing of government orders relating to the draft, prices, wages, priorities and other controls and maintaining liaison with the government agencies in charge of those matters and with the military services —the primary function in mind being to keep the Independent companies advised of developments with suggestions for action by them. One serious problem has already arisen out of the national defense situation and USITA Executive Vice President Clyde S. Bailey has promptly moved to settle it. Mr. Bailey has written Chairman George of the Senate Finance Committee urging action on the Senate Committee-approved bill to suspend the tariff duty on foreign copper because of the urgent need of Independent telephone manufacturers to obtain supplies which are becoming increasingly difficult.

New Pricing Policies

INDEPENDENT telephone manufacturers, an outstanding group in World War II for their efficient production methods in meeting military needs and whose practices with regard to government contracts met with the highest commendations from the then War and Navy Departments during and after the war, can look at newly announced contracting, pricing and profit policies of the Department of Defense with satisfaction in their own efforts.

No doubt with an eye to the possibility of another Truman Committee, the Department of Defense has announced that urgency of need will not be used as an excuse for waste of defense funds or inefficient buying practices. Emphasis will be placed on types of contracts and contract pricing methods which encourage economy and production efficiency, it was stated in an announcement of the Department of Defense Munitions Board.

"The effect of the pricing policy," the board stated, "is to conserve limited manpower, materials, facilities, and other resources, as well as to support controls over prices, wages and materials when established by agencies outside the Department of Defense."

The new policy places close controls over types of contracts to be used. It stipulates that fixed-price contracts will be used without provisions for price redetermination or escalation throughout the Department of Defense whenever practicable. Incentive-type contracts may be used where dollar amounts are large, production periods long and when reasonably close "target prices can be established."

Significantly, the board's announcement said "Emphasis will be placed on the prevention of excessive profits through close forward pricing and repricing rather than through recapture of excessive profit by renegotiation. Prevention of excessive

(*Please turn to page* 84)

✓ Detect, ✓ Correct, ✓ Protect and further improve

By H. G. Turner

Assistant Vice President, Operating Department
Southern Bell Telephone & Telegraph Co.

THE EXCHANGE and toll cables are the arteries through which the life blood of our customers' service flows. Each small pair of insulated copper wires are the nerves over which the calls are made. Like a gigantic silvery spider's web they spread out from the central offices.

As of the first of April, our company had approximately $150,000,000 invested in exchange cable—the annual maintenance cost of which runs close to $5,000,000. By the end of 1950 our investment in exchange cable will have been increased to $177,000,000. There will be approximately 13,000,000 miles of insulated copper wires in the cable—enough to reach around the world 520 times.

To start with, correct engineering and construction of cable plant is a vital factor in any Cable Maintenance Program. It should be engineered to be as trouble free as possible and constructed as designed to give the best performance at the lowest operating cost. The Construction Forces must follow the plans and standard practices and construct underground and aerial cable free from service hazards and with the proper clearances.

Many variables are involved in constructing aerial cable plant. It is important that the strand tension be accurately adjusted, poles be as uniformly spaced as conditions will permit and properly guyed so that the cable will remain in position.

Maintenance Program

TO FURTHER improve and make the local and toll service more dependable and of good transmission quality, the cables must be maintained as free of defects and in as good operating condition as possible. Southern Bell has worked out one of the best Exchange Cable Prevention Maintenance Program in the System for correcting at least 60 per cent of the cable defects with routine effort before the customers' service is impaired—the ultimate objective for the Company will be 70 per cent.

To Reduce Complaints

THIS EXCHANGE Cable Preventive Maintenance Program will further reduce the number of service complaints and reports now received by the Business Office, Repair Clerks and the Test Desk. It will also help bring about an improvement in local and toll completion, speed of service and a reduction in "NC"—no circuit —conditions.

Defects

THE TELEPHONE cables are constantly exposed to the elements, the sun bakes them, rain and seeping water soaks them, water freezes and ice loads them down, wind and storms shake them, lightning and falling limbs strike them, and young boys and not-so-young boys crack them with 22's.

The most frequent defects to cables are—

(1.) Cracks at the end of the joint caused by vibration and strain.

(2.) Burns resulting from lightning, power wires and power arc follow-up.

(3.) Crystallization due to vibration—causing molecular fatigue.

(4.) Ring cuts and rock dents.

(5.) Squirrels "manicuring" their teeth on the cable sheath.

(6.) Beetle holes—there is a species of beetle that seems to delight in boring minute holes through the

NITROGEN GAS TEST AND SLIT-SHEATH REPAIR

1 *A hole is drilled in the lead sleeve with a cable boring tool prior to the attachment of a pressure testing clamp.*

2 *Next step is the actual attachment of the pressure testing clamp as shown in this operation.*

3 *Nitrogen gas is admitted into the cable through a hose from a metal cylinder or tank.*

EXCHANGE CABLE MAINTENANCE

Customer Service

cable sheath to cause future trouble.

(7.) Trees blown on the cable during storms.

(8.) Car damage by the "hot rod boys" hitting poles, thereby straining and knocking the cable loose, often breaking the sheath.

(9.) Damage from workmen laying new gas, water and sewer lines, repairing streets and making road changes, cutting underground and buried cables.

(10.) Water, fire, electrolytic, galvanic corrosion, lightning and electrical burns are some of the most deadly enemies to cables. It is heartening to note that cable troubles caused by telephone workmen have steadily declined during the past few years. Today telephone men everywhere are using care in the protection of telephone plant and our customer's service.

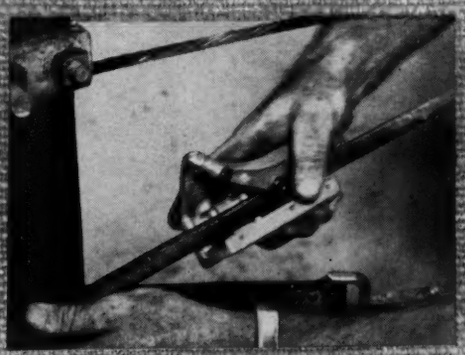
Construction forces are pictured placing a section of underground alpeth sheath cable.

Small Cracks Highly Damaging

THE MAJORITY of sheath troubles are caused by small cracks that are difficult to detect. The best way to find these cracks before our customers' service is affected is through the use of the electronic test set and the gas pressure-soap solution method. A cable being metallic expands during the heat of the day

(*Please turn to page* 76)

4 ***The cable is now soaped. Any appearance of bubbles indicates a hole in the cable sheath made by the escaping gas. The bubble at the end of the brush in the picture above reveals trouble.***



5 ***Trouble spotted, the cable sheath is now opened at the location of the hole by first slitting the sheath with a slitting tool.***

6 ***A cable sheath opener is then used to carefully separate the lead sheath from the wires.***

Wintertime MAINTENANCE Of Outside Plant

By John S. Reed
Lincoln Tel. & Tel. Co.
Lincoln, Neb.

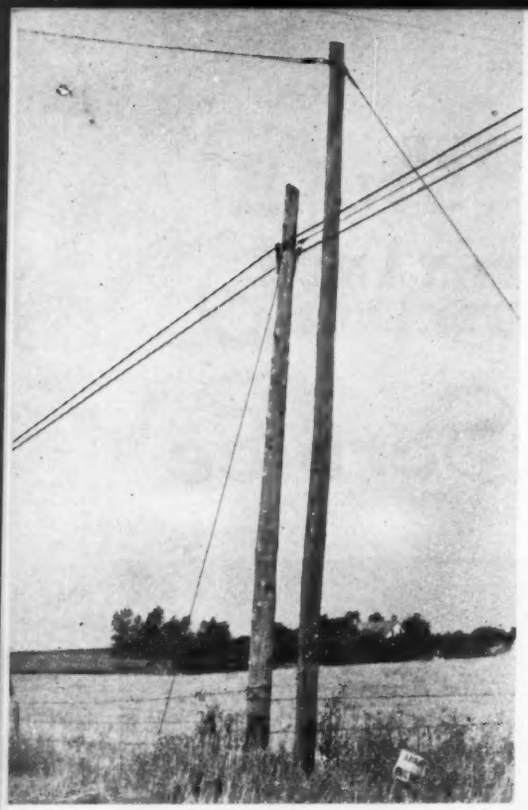


Fig. 1—Power stub guy located too close to a bracket lead for safety.

Fig. 3—The surface of this pole is badly decayed.

Fig. 4—This pole should have been replaced instead of being stubbed in an unsatisfactory manner.

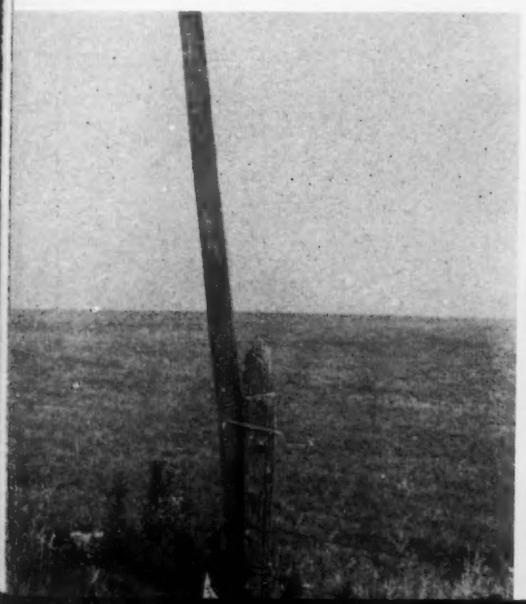


Fig. 5—A typical stubbed pole installation showing use of stubbing bands to effect a neat and workmanlike job. Note that the stub has the same circumference as the pole.

WHEN A TELEPHONE exchange is converted to a higher service classification, such as from magneto or common battery to dial, the entire plant is at its peak of operating efficiency, because of the fact that everything in the plant has been renovated. New subscriber's instruments have been installed. Old and worn drops have been replaced and new runs properly routed to avoid trees and obstructions. The cable leads have been repaired and are now supported by the spinner lashing method, resulting in much neater looking and better working cable runs. Open wire leads have been rebuilt to modern standards. The central office equipment, of course, is brand new. The telephone building has been rebuilt or remodeled and now presents a creditable appearance. The result is that the subscribers can have more prompt and accurate connections with other subscribers, with clear transmission, higher signaling efficiency, and more courteous and friendly attention from operators. The immediate result is good public relations expressed simply as subscriber good will towards the telephone company.

To maintain the operating efficiency of the telephone plant at a high level, the plant must be properly taken care of. Because of the fact that outside plant is exposed to the destructive action of the weather elements, it deteriorates at a more rapid rate than equipment in buildings. Since the plant is spread over a large area of town and country, it cannot be kept under continuous observation as in the case of inside equipment.

Outside plant obviously should never be permitted to deteriorate to

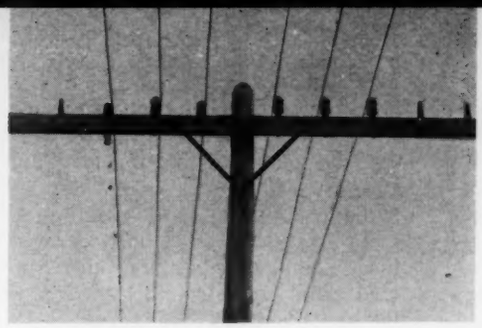


Fig. 7 (above)—Insulator pin settling on crossarm indicates that wood is rotting around pin.

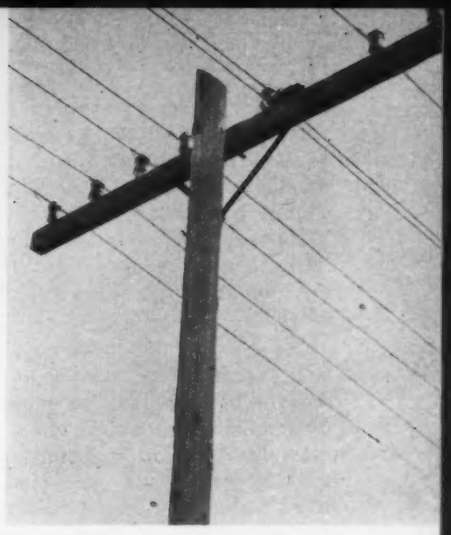


Fig. 8 (right)—Insulator pin and crossarm have decayed to the extent that the pin has pulled out of the arm and the arm itself has split at the end.

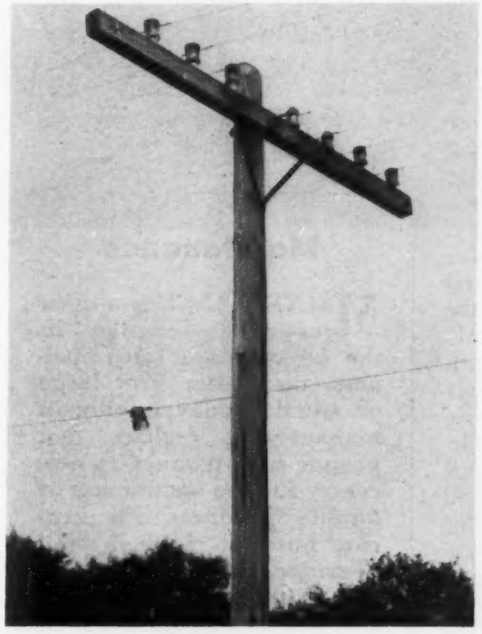


Fig. 9—Floating insulator caused by pin coming out at end of crossarm.

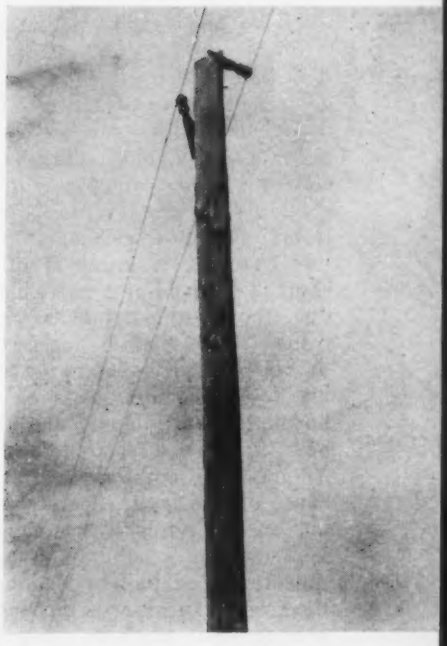


Fig. 10—This split bracket will have to be replaced.

Fig. 6 (below)—Illustrating method of assembling pole stubbing bands.

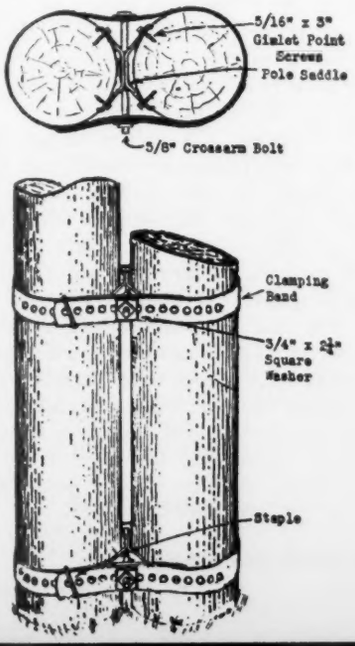
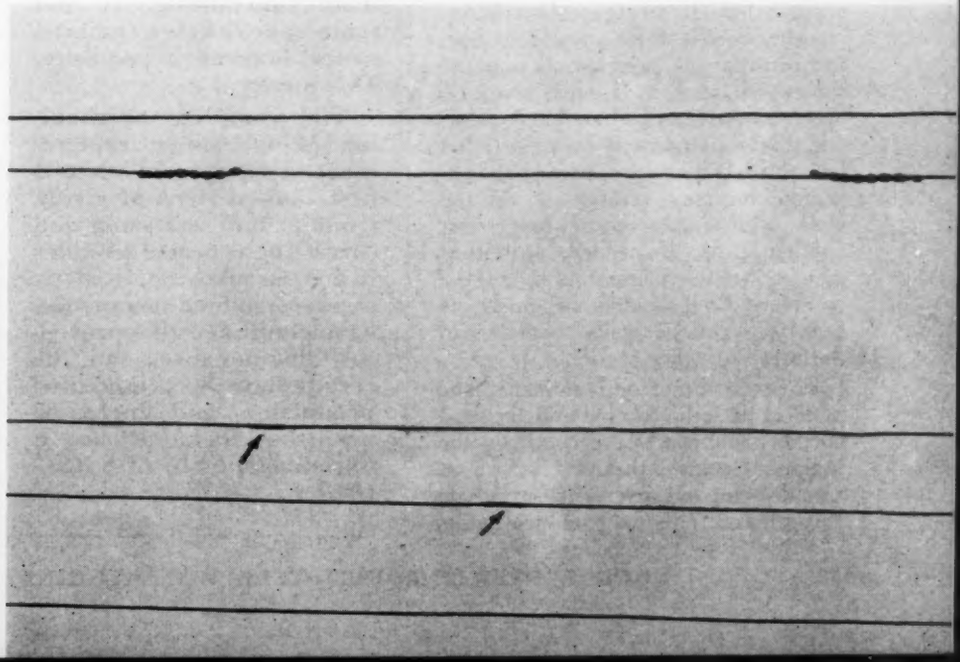


Fig. 11—Neat and inconspicuous appearance of compression type sleeves (shown by arrows). Note that two double-tube twisted sleeves (below) are required to splice a single line wire.



the point where the service becomes very unsatisfactory to subscribers and the only remedy is to completely overhaul the plant. Telephone lines cannot be built to last forever, but it should be possible to maintain the lines in such a way that they will give many years of good, reliable service.

Such a program is termed preventive maintenance, which has a familiar ring to many telephone men. Yet many companies have not or cannot put this all important program into effect, or having started one, have failed to keep it up. In these companies it is a common thing for a repairman on being assigned a trouble case, to say, "Oh, I know where to find that trouble!" A statement of this kind indicates all too well that this trouble has occurred so many times in this particular location that the man can recognize the cause, go straight to the place, and clear the fault in a matter of minutes. Certainly he should have fixed the trouble in a more permanent manner. For example, if a report of a line short is received on a particular rural line, the man assigned to clear the trouble finds that a "locked aerial" (wires tangled together) is responsible for the short, he may merely knock the wires apart and then report that he has cleared the trouble. Yet he does nothing about the real cause of this fault, excessive slack in one of the wires which causes this wire to wrap around its mate everytime the wind blows. Had he taken the trouble to observe the true cause and cut out slack to even up the wire spans and made sure that the spans had the proper sag for the temperature conditions, this fault would not have recurred.

Outside plant can be successfully maintained by two methods, one supplementing the other. The first method is to train plant workers to observe the circumstances surrounding the trouble location and to correct, insofar as possible, the actual causes of trouble. If more work is involved than can be handled by himself, the repairman is to report this fact to his supervisor. In a small exchange he may arrange to do the work with one or more helpers at another time, if needed. In either case, a written memorandum of the work required should be made as such jobs can be easily forgotten in the press of other work.

The second method is to inspect the plant at periodic trouble to detect and correct trouble while it is still in the incipient stage; that is, before it actually can interfere with service to subscribers. This is true preventive maintenance. Such a program carried through for a number of years will keep the outside plant in excellent shape, while at the same time reducing trouble cases to minimum. In the long run, it is actually cheaper than a complete rehabilitation of run down plant and has the advantage that the plant is maintained at its high operating efficiency at all times.

This article discusses inspection procedures and methods of repairing or replacing items of outside plant.

Suggested Periodic Inspection Procedures

EXPERIENCE of many telephone companies indicates that an overall inspection and repair of outside plant every two years is sufficient to keep the plant in good shape. Moreover, this program coincides with the two year tree trimming cycle standard in most localities; hence, the inspection will indicate the locations where trees require pruning and where shrubs and other unwanted growths must be removed for adequate line clearance.

The early fall days are especially well suited for the inspection and repair routine, since interruptions due to inclement weather will be relatively few. This work may, however, be conducted at other times of the year as permitted by prevailing weather conditions, if considered more convenient. If the telephone company has several exchanges in its area, it may be necessary to spread the inspection work over the warm season periods of the two-year cycle in order to thoroughly cover all exchanges in the area.

The employee responsible for the inspection of the outside plant should have a rural plant record map of the exchange scheduled for the inspection and a form on which to record the condition of each plant item requiring repair or replacement. One man is capable of doing this work, but a helper will speed up the inspection since he can drive the car while the inspector observes the wire lead and makes his notes. It should be noted that an inspection form is not essential for recording observations; in fact, better results may be obtained by writing down in detail the work that should be done to correct unsatisfactory conditions observed.

After the inspection is completed, the inspection forms are studied to determine the logical sequence of work items for assigning to repairmen. As these men have time from their station installation and trouble shooting work, they will locate and repair or replace defective plant items in line with the instructions furnished them.

Small companies may prefer to handle the inspection and repair work at the same time. In this case, the inspector is provided with a truck loaded with the items of materials and tools to enable him and his helper to make the required repairs.

In judging the condition of the plant, the inspector should not be too hasty in condemning items of plant that are obsolete or that do not exactly meet construction standards as long as they are not hazardous to plant workers or to the public, or will not be a source of trouble later on. For example, knobs and brackets for drop wire attachments on poles are no longer in use, but any that are found in place should not be replaced if they are in good condition and are firmly attached.

(*Please turn to page* 70)

Maintenance

MAINTENANCE is a most essential function in the operation of any business, no matter how large or small. Today intelligent management realizes that proper maintenance is necessary for the production of quality products. No firm can hope to have a well organized production operation without an integrated maintenance program. During the war period operating management learned that if increased demands were to be met a maintenance program had to be more than just the necessary day-to-day maintenance required to keep their equipment functioning. At that time preventive maintenance became a requisite. This meant:

The complete overhauling of machines; replacement of equipment when it first showed signs of giving trouble; and analyzing and correcting repeated troubles in a given machine. In many cases farsighted companies have continued this preventive maintenance, and the results have been increased production and increased profits. — ***By Matthew A. Cavanaugh, SURPLUS RECORD.)***

Beating Wet Weather to the Punch

TELEPHONE maintenance men know the damage Old Man Moisture can do to the company's outside plant. Even "the gentle dew from heaven," seeping into tiny cracks in aerial cables, can saturate the paper wrappings on wires and put telephones out of service. The plant department of the Southwestern Bell Telephone Co., however, doesn't wait for "wet-weather troubles" to become "out-of-service reports." It believes in finding trouble—before it happens.

Last year, some 68 per cent of all troubles in S. W. Bell customer's lines were found and corrected *before customers were aware of them.* And line insulation testing played a big part.

Line insulation testing can detect pin-sized holes in aerial cables miles away from a central office. Heart of the process is the line insulation test set, or "megger"—an electronic device by which a telephone switchman can test as many as 10,000 stations an hour.

Wet weather and megger testing forestall the majority of dropwire and cable troubles. Illustrated in the pictures (*See pages* 34 & 35) are the steps taken in clearing a defect picked up by "megger" test.

In all larger offices, the S. W. Bell makes these tests dozens of times a month. They're standard procedure in damp or rainy weather. They're also made every dawn—rain or shine.

Here's why. During the heat of the day, a cable—being metallic—expands. In the cool of evening and night it contracts. This continual push and pull produces strains and eventually tiny cracks develop. Temperature changes also cause the cable to "breathe". Air will leak out of the cable through a small crack or hole in the heat of the day, and will be sucked in during the night. At dawn the suction is the greatest and the moisture content of the air, or humidity, is the heaviest.

Wires inside the cable are wrapped in paper insulation and when breaks develop, the paper attracts moisture. It's the tiny leakage of electricity through this moist paper that megger tests pick up. So testmen are warned of impending trouble before a hard rain comes along, thoroughly wets the insulation and puts telephones on the out-of-service list.

The plant department takes special pride in its line insulation testing because it helps place S. W. Bell at the top of the Bell System for trouble-free service. But there's another and more personal reason. Three pieces of equipment used in line insulation testing were developed by Southwestern Bell plant men.

The line insulation test set was developed by four St. Louis plant men —W. V. Rohan, district plant superintendent, Downtown, Walter Briggs, chief switchman, Downtown, Paul Poettgen, chief switchman, Cabany, and Art Dickens, equipment chief, North District. The set is in general use throughout the Bell System.

The battery breakdown test set was developed by the St. Louis plant people to more easily locate defects picked up on megger testing. By applying a high voltage, the cable pair showing a leak can be "shorted out."

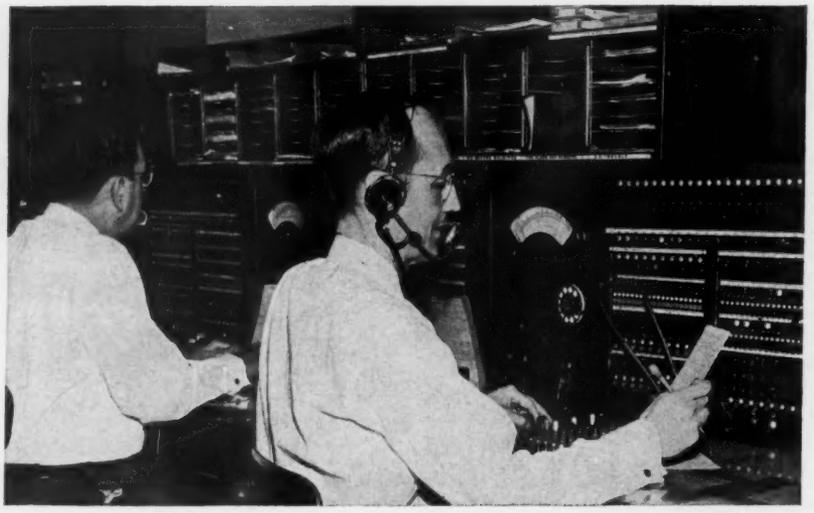
The exploring coil on the permanent pole mounting (shown on page 35) was developed by E. P. Wilson, cable repairman, South district, St. Louis.

To "explore" aerial cables without climbing poles or ladders, repairmen used to tie the coil or "feeler" to the end of a tree-trimming pole. Wilson's permanent mounting improves on this idea. His pole is assembled from sections. Wiring runs inside the pole and sections are connected through jacks and plugs. This eliminates danger of "shorts" from dangling wires. Wilson also reduced size and weight of the "feeler." A Bell Laboratories pilot model of his mount is now under test in this company.—(*Please turn to page* 34.)

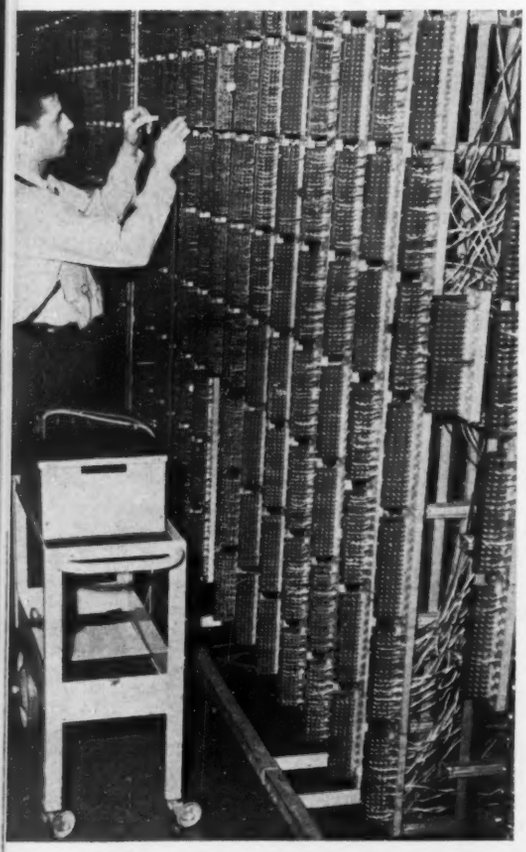
Beating Wet Weather

(Continued from page 33)

Wet weather or "megger" test is first step in detecting moisture leaks. Here Walter Briggs runs shoe of megger set over line terminals as W. V. Rohan watches set for an alarm. These St. Louis plant men were two of the four who developed line insulation test.



Deskman tests the line with a Wheatstone Bridge—a powerful device for measuring resistance. This measurement is more precise than megger's. With resistance reading plus standard tables, deskman often can narrow down leak's location to less than 300-foot section of cable. Here, William Schlattman, deskman, St. Louis-Downtown, has completed bridge test and is giving facts to repair forces.

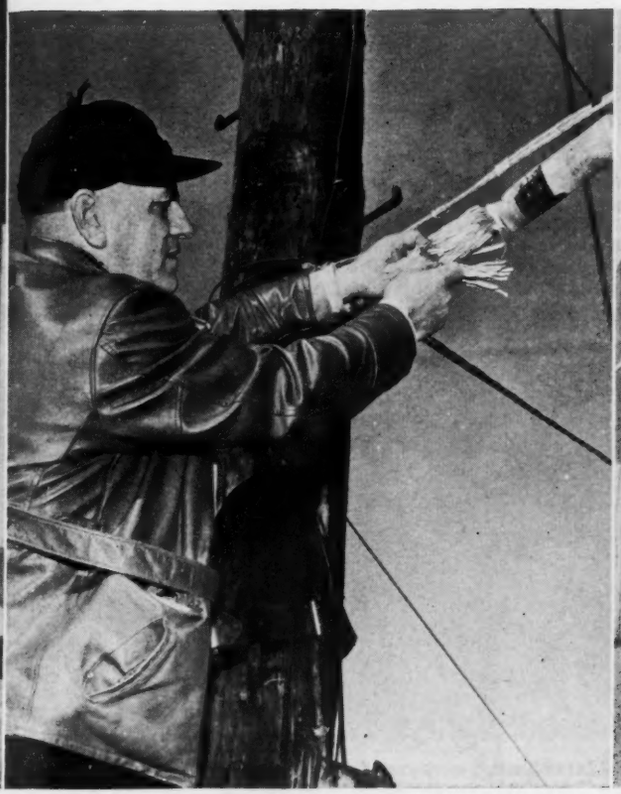


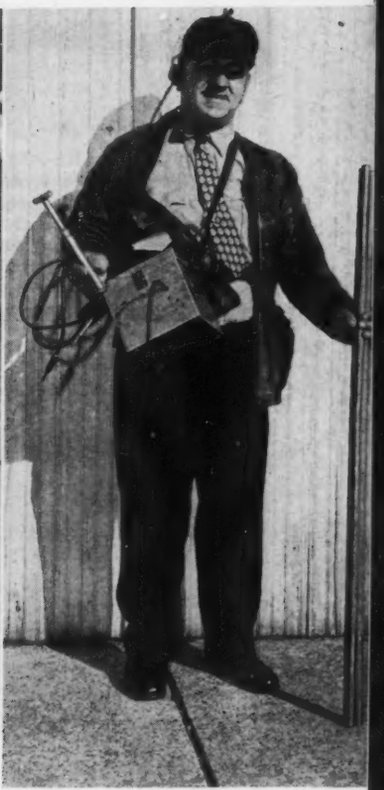
Lines with minor leaks are marked for later reference. Here, John Cook, switchman, St. Louis-Downtown, attaches tab to terminal of line on which alarm sounded. Serious leaks are referred immediately to the test desk.

Cable repairman drives to where he's directed by the testboard. In this picture, E. P. Wilson, South District, St. Louis, attaches leads of battery breakdown test set to line at terminal box. With high voltage, he "shorts out" defective wire pair at point of leak. Next, he puts tone, located in break-down test set, on the line.

Thanks to Southwestern Telephone News for the illustration used with this article.

Old way of using exploring coil by hand to locate exact point of leakage was more hazardous, as this picture shows. Repairman either did this or rested his ladder against cable.





Wilson then uses pole-mounted exploring coil, which he personally developed, to locate exact point of trouble. Exploring coil picks up tone signal, which fades at trouble point.

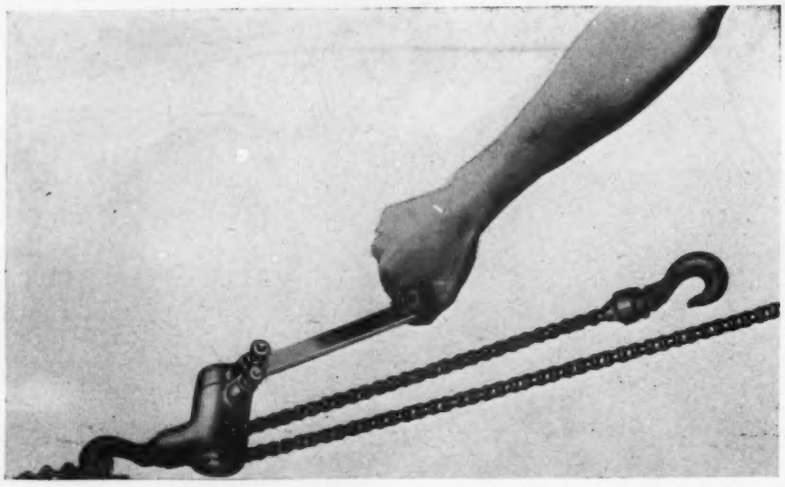
Since defect is close to pole, Wilson climbs up, cuts away the lead sheath, and repairs defective wires. After completing job, he'll wrap up exposed part of cable in rainproof wrapping. A splicer will make permanent repairs later.

Job over, Wilson shows how pole mounting can be disassembled. He holds exploring coil in right hand.

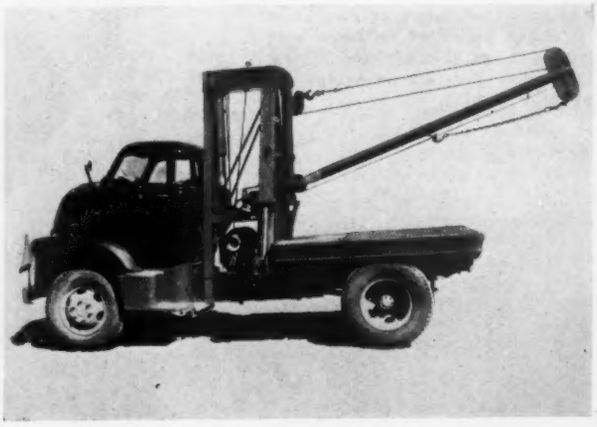
"Just Off The Produ

NEW METHODS, new equipment and new and better ways of performing old jobs is the continual goal of the telephone industry and the many manufacturers serving the industry. The constant flow of improved tools, equipment and materials has long contributed to the present efficiency of the telephone industry.

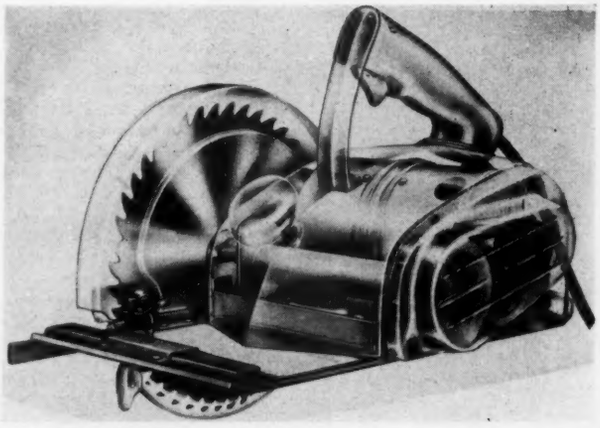
On these pages we are presenting a "pictorial review" of some of the new and improved products. We have many more items that will be presented in future issues



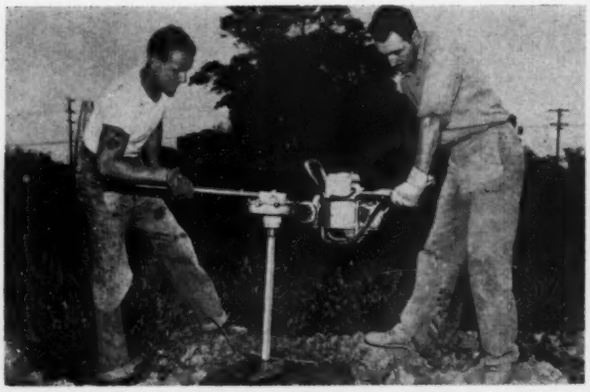
MIDGET PULLER — New, large capacity *"Mighty Midget Puller"* has been announced by the *Coffing Hoist Co.* The *"Mighty Midget,"* a hand-operated hoist or puller, weighs 9½ pounds, takes up less than a foot of space, yet handles a full 1,000-pound load on any pulling job.



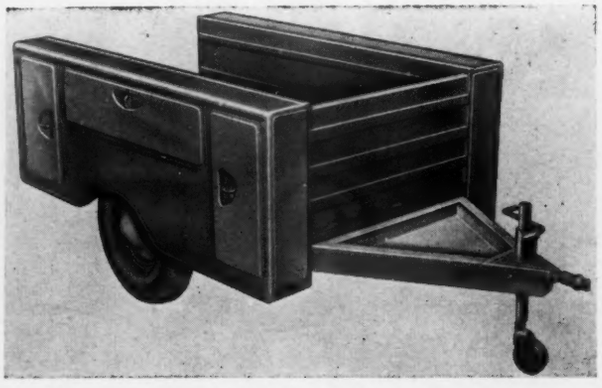
TRUCK CRANE—The *"Hydra Lift,"* manufactured by the Pitman Manufacturing Co., is a new mobile truck crane that can be installed on any type of truck and used with any make winch. The manufacturer states that the *"Hydra-Lift"* is less expensive to maintain, because there are no gears or clutches to wear out. Operation is simple —the truck driver can control all swinging and lifting.



PORTABLE ELECTRIC SAW—*Syntron Portable Electric* Saw weighs 19 pounds; is equipped with a Universal motor drive developing up to 1½ H.P., and is fitted with an 8½" blade and having a 2-11/16" capacity cut. The new feature of this saw is the dual V-belt drive from the Universal motor shaft to the saw arbor shaft. It is claimed this use of V-Belts entirely eliminates gear maintenance expense.



EARTH DRILL—The *"Earth Drill,"* announced by *McCulloch Motors Corp.* is a 5-hp, gasoline-powered post-hole digger reported to be capable of drilling at a high rate of speed in any type of earth or clay. Weight of the two-man *"Earth Drill"* complete with 6-inch auger is only 79 pounds. A full-swivel coupling at the engine permits the auger to drill at any desired angle.



"TRAILETTE"—The *Morrison Carry-All Trailette,* manufactured by *Morrison Steel Products, Inc.,* is a hitch-all, two wheel, all-purpose *Trailette* that hitches to any light truck or passenger car. The unit hitches to all standard bumpers—and is completely equipped with an all-car hitch, support jack, wheels, tires, tubes, lights, semi-elliptical springs and a torque-less axle.

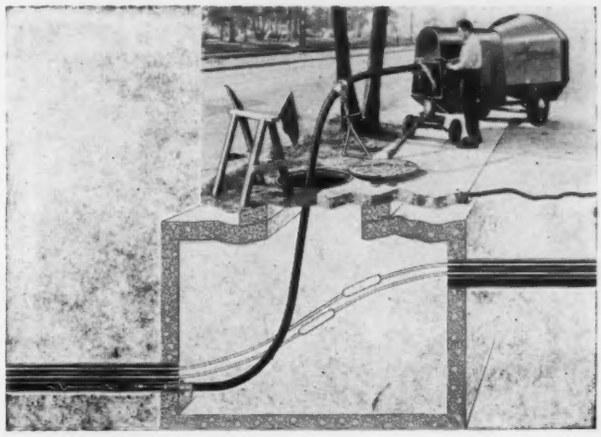
roduction Line"

By Myrle Shafer

Contributing Editor
Telephone Engineer Publications

of TELEPHONE ENGINEER Publications. If you see an item on these pages that "strikes your fancy," and would like to have more information—just drop a card in the mail, addressed to me in care of Telephone Engineer Publishing Corp., 7720 N. Sheridan Rd., Chicago 26, Ill., and we'll send complete data.

"RODUCTOR"—Known as the *"Flexible Roductor,"* this new power machine manufactured by *Flexible Sewer Rod Equipment* Co., is designed to push, pull and rotate "Flexible" steel rods in ducts. The manufacturer states it will work at speeds of up to 100' per minute and will rod 900' in one direction, from one location.

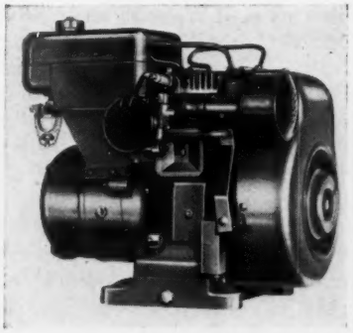


The *"Roducter"* is especially effective for boring through dirt and debris, fishing out burned off cables, pulling light weight cables and pulling proving mandrels. The unit offers many advantages, among which are: (1) Keeps workmen on street level out of water; (2) eliminates gas hazards.

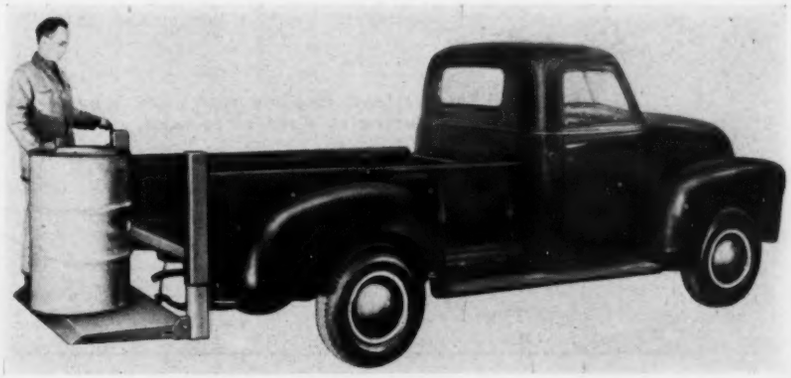
HEADREST SPECTACLE—New headrest (LTB-50) spectacles are available from General Scientific Equipment Co. The headrest evenly distributes the weight over the entire head.

CHAIN SAW — One man can easily handle the new Model 3-25 chain saw announced by *McCulloch Motors Corp.* Total weight of complete saw, including blade and chain, is only 25 pounds.

LIGHTWEIGHT POLE JACK—The *Templeton, Kenly & Co.*, has announced production of No. A329 Simplex Pole Jack, featuring an aluminum alloy housing that cuts 35 pounds off the weight.



GENERATING PLANT—Designed for applications needing a portable source of electric power, a new 400-watt, 60-cycle, A. C. electric generating plant that "will operate for *five hours* on a *single gallon* of gasoline" has been developed by D. W. Onan & Sons, Inc.



TAILGATE LOADER—A hydraulically powered tailgate loader for pickup trucks, called the *"Lift-O-Matic"*, has been developed by the *National Lift Co.*, subsidiary of *Gar Wood Industries, Inc.* The *"Lift-O-Matic"* can easily be installed on most pickup trucks. Its lifting capacity is 1000 pounds. The hydraulic power is provided by a fan-belt driven hydraulic pump with its own self-contained clutch. The pump operates only when lifting power is needed. One handy control, installed on the *"Lift-O-Matic,"* is used for either raising, holding or lowering the tailgate.

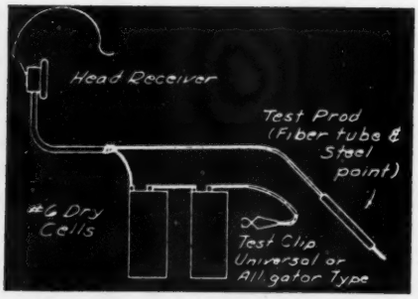


Fig. 1—Simple Continuity Test Circuit.

Modern Testing Procedures

By B. C. Burden

Engineer, Lincoln, Nebraska

Part One of—"A Series of Articles written for the Apprentice Wire Chief and Beginning Troubleman."

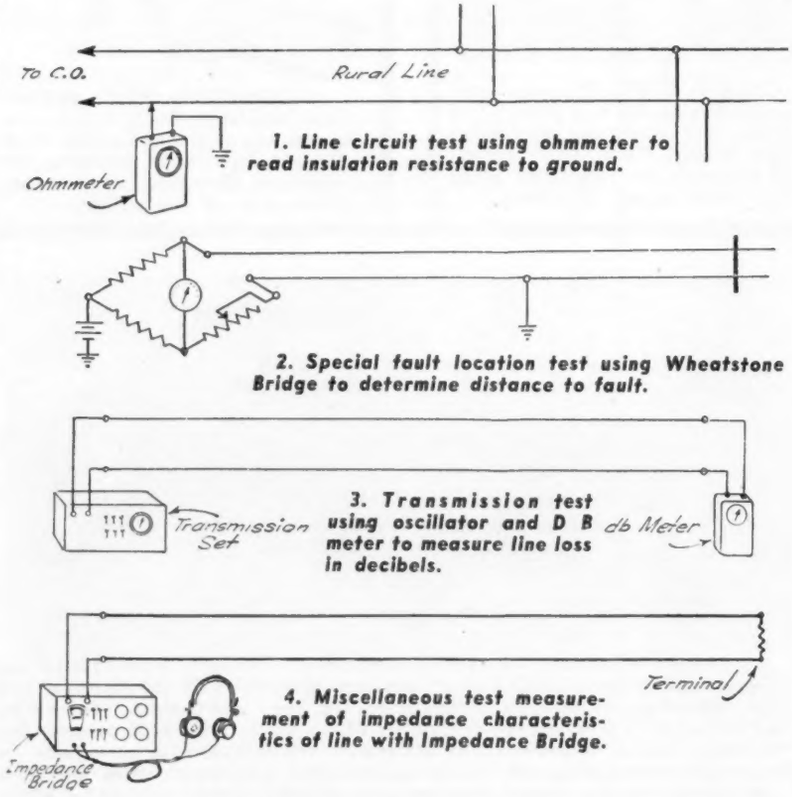

To C.O.
Rural Line
Ohmmeter
1. Line circuit test using ohmmeter to read insulation resistance to ground.
2. Special fault location test using Wheatstone Bridge to determine distance to fault.
Transmission Set
3. Transmission test using oscillator and D B meter to measure line loss in decibels.
db Meter
Terminal
Impedance Bridge
4. Miscellaneous test measurement of impedance characteristics of line with Impedance Bridge.

Fig. 2—Four Basic Types of Tests.

THIS ARTICLE discusses various items of testing equipment and procedures with particular reference to circuit testing. The efficient location of faults in telephone outside plant and in central office and subscribers' station equipment, requires both skill and adequate testing apparatus.

A skilled trouble man, given enough time, can identify and usually locate virtually any type of circuit trouble with a simple receiver-battery continuity tester. This statement should not be interpreted to mean that the well equipped trouble shooter requires only a receiver, a dry cell, and some test leads.

Actually, as every up-to-date operating company knows, trouble shooters, even the most expert, can locate trouble *quickly and efficiently* only if they have modern testing units.

A first class man, using the simple test arrangement shown in *Fig.* 1 may require two hours to run down and clear a case of trouble, whereas this same man, provided with proper test instruments, could on the same case, cut the time to one hour. Although this comparison is purely hypothetical, it is a good illustration of the savings in time made possible with proper test equipment.

It is evident that with labor costs often as high as $1.50 or more per hour, good testing equipment will quickly pay for its initial cost and then earn dividends for many years.

This series of articles is intended as a general review of testing equipment and practices and is so written that it may serve as a training text for new men.

Types of Tests

THE VARIOUS tests (*see Fig.* 2) required in the installation and

operation of a telephone exchange can be classified as:

(1) Line and equipment circuit tests.
(2) Special fault location tests on cable and open wire.
(3) Transmission tests.
(4) Miscellaneous tests.

The simplest and most common type of tests are *line and equipment circuit tests.* These determine the condition of telephone equipment and circuits *from a simple d-c electrical standpoint.* Line and equipment circuits tests may be further classified as:

(a) Tests made with direct current volt-ohmmeter equipment which measures the d-c electrical conditon of the line and thus indirectly show the condition of the line from a transmission and signalling standpoint.

(2) Tests made with portable telephones with or without fault direction features which determine the general line condition and the direction in which faults lie.

Most testing in the average telephone exchange comes under category number one above.

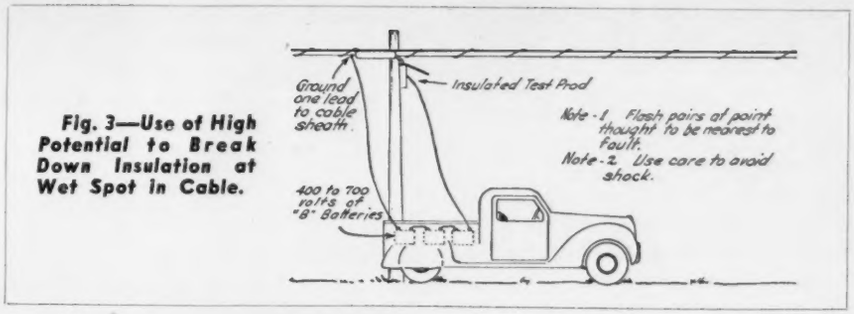
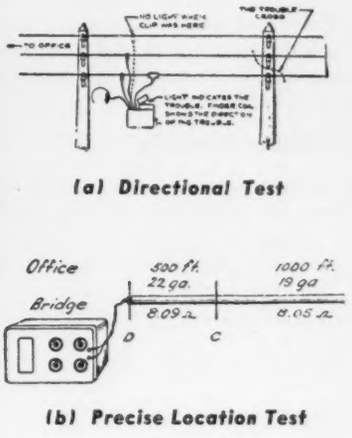

Ground one lead to cable sheath.
Insulated Test Prod
Note - 1. Flash pairs of point thought to be nearest to fault.
Note - 2. Use care to avoid shock.
400 to 700 volts of "B" Batteries

Fig. 3—Use of High Potential to Break Down Insulation at Wet Spot in Cable.

Fig. 4—One Type of Wire Chief's Test Panel for Small Office.



(a) Directional Test

(b) Precise Location Test

Fig. 5—Two Classes of Tests.

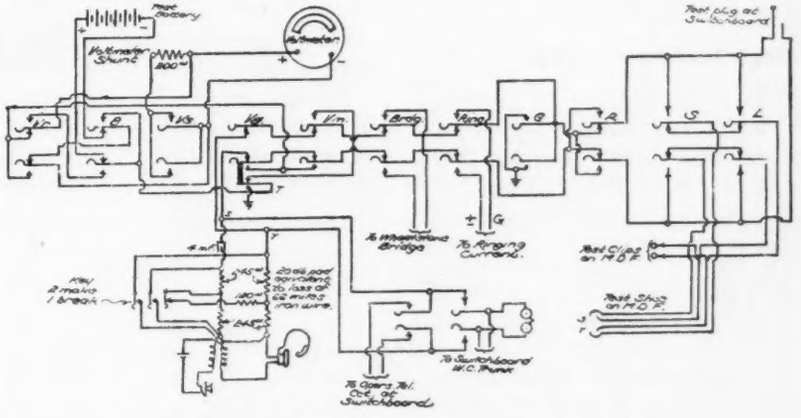


Fig. 6—Circuit of Multi-Key Wire Chief's Test Panel.

Special Transmission And Miscellaneous Tests

SPECIAL TYPES of fault location tests refer to the use of such instruments as the Wheatstone Bridge to locate grounds, shorts, crosses, etc. Such tests are made primarily on telephone cable. The use of high potential break-down equipment (*see Fig.* 3) to break down high resistance cable faults is another type of special test. Location of circuit faults by means of tone sets and exploring coils can also be properly included in this sub-classification of circuit faults.

Under the general head of *transmission tests* can be grouped measurements which check the transmission ability of a telephone circuit in terms of decibels, impedance, and capacitance measurements of telephone wire and cable, and frequency measurements. Inductive interference and crosstalk measurements are made with special equipment to determine the harmful effect on transmission of induced power and other noise.

Miscellaneous tests include those not falling in the above categories, for instance the measurements of foreign potentials on underground telephone structures (to detect electrolysis) capacitance balance tests made in connection with the installation of new quadded cable, etc.

The most fundamental overall test which can be made on any telephone circuit is one which tests the transmission ability of the circuit over a range of frequencies comparable to those used in voice transmission, plus signalling tests at the ringing frequency. Tests of this type, while a positive indication of the usefulness of a circuit from a telephone standpoint, require relatively expensive equipment. The simple circuit d-c tests as previously stated indicate *indirectly* the transmission and signalling efficiency of the circuit and furthermore these are easier to make than transmission tests and are more useful in determining the location of any faults which may be present.

For many years telephone companies have used the D-C voltmeter in series with a source of direct current (usually a battery) the basic instrument for detecting and locating trouble on telephone circuits and lines. This instrument is known as the Wire Chief's Testing Panel (*see Fig.* 4) when located in the central office as a permanent part of the central office test equipment. When a somewhat similar instrument but in portable form is used in the field, it is usually known as an ohmmeter or multi-range tester.

For reasons which have never been understood by the writer, the telephone industry has for years seen

fit to retain the d-c voltmeter calibration on Wire Chief's voltmeters rather than to add direct reading ohmmeter scales which would be much easier to use and read than are the conversion charts which are required with d-c voltmeters. However, in recent years there is some improvement in this situation as some companies are now putting out the direct reading ohmmeter scales on their Wire Chief's panels, but many operating companies still specify straight voltmeters.

Portable testing meters usually have several scales and are capable of reading resistance on several different ranges, and also voltage and milli-amperes.

Ohmmeter Formula

A D-C VOLTMETER can be used as an ohmmeter as the reading of a voltmeter in series with a battery is inversely proportional to the value of the resistance connected to the test terminals of voltmeter and battery., i.e.

$$X = \frac{(E - 1)}{D} R.$$

That is to say, the resistance connected to the test leads is equal to the voltage of the test battery divided by the deflection minus one and this result multiplied by the resistance of the voltmeter. Any d-c voltmeter can be calibrated to read in ohms by use of this simple equation.

Circuit Testing Methods

THE LOCATION of ordinary faults such as grounds, crosses, opens, and shorts, in open wire, cable, or equipment can be accomplished by any one or combination of four basic methods, viz:

(1)—Visual observation.
(2)—Simple d-c or a-c electrical continuity tests.
(3)—Measurement tests using a reading ohmmeter.
(4)—Precision measurement using a Wheatstone bridge.
(5)—Directional tests with various types of inductive tone sets.

Visual observation is often very effective and a good troubleman can, without even a preliminary test, in many cases go directly to the source of trouble without a single test.

A keen sense of observation is always an asset in trouble shooting, but in many cases considerable time can be wasted by "looking" instead of "testing".

Testing, to be effective, must proceed in an orderly, analytical manner. Each successive test should clearly show the direction of the trouble from the tester.

Haphazard testing can result in the trouble shooter's "going by" the trouble, thus wasting time and effort.

Day to day testing can be considered as falling into two distinct classes (*see Fig.* 5)

(1)—Tests which tend to show only the direction of the fault from the tester, and

(2)—Tests which indicate the distance in miles (or feet) to the fault.

The first step in following through on a reported case of trouble is to check the line circuit from the Wire Chief's voltmeter. This serves to localize the trouble as being either in the C. O. apparatus, or in the line circuit toward the outside plant. If the fault is in the outside plant, a simple resistance reading in the case of shorts, crosses, grounds, will give (in some but not all cases) an indication of the distance to the trouble.

Such measurements are usually rough at their best as the fault (and/or ground) resistance is in the picture and always there is a real doubt as to the distance out to the fault. The primary purpose is to identify the type of fault, and to determine whether it is in the C. O. equipment or the outside plant.

Theory and Operation Of The Wire Chief's Voltmeter

THE ESSENTIAL elements of any Wire Chief's voltmeter are the voltmeter, test battery, switching keys, telephone, and test leads.

Several switching keys (usually 6 or more) are used. These permit the quick connection of the voltmeter in a variety of arrangements for testing telephone lines for shorts, crosses, grounds, foreign potentials, opens, and transmission and signalling checks. To the beginner, the multiplicity of keys may be somewhat confusing. However, if the elementary circuit brought about by throwing any key or combination of keys is learned, an understanding of the Wire Chief's Test Panel becomes a simple matter.

As an aid to the apprentice test board man, the circuit of a typical Wire Chief's panel is shown in *Fig.* 6. This circuit with minor variations is virtually standard, throughout the United States. The *Fig.* 7 shows the schematic connections brought about by operation of any key or combinations of keys and the type and purpose of each test. This chart should be useful in training new test board men. It must be kept in mind that all test panels are not identical but comparison of circuits will indicate any slight deviations and difference in key arrangement can be marked on the chart.

—Part II of Mr. Burden's article on "Modern Testing Procedures" will appear in the October, 1950, FORTNIGHTLY TELEPHONE ENGINEER. *In the second installment, Mr. Burden will discuss—Portable Circuit Testing Instruments including the ohmmeter, directional tone sets, and directional fault location sets.*

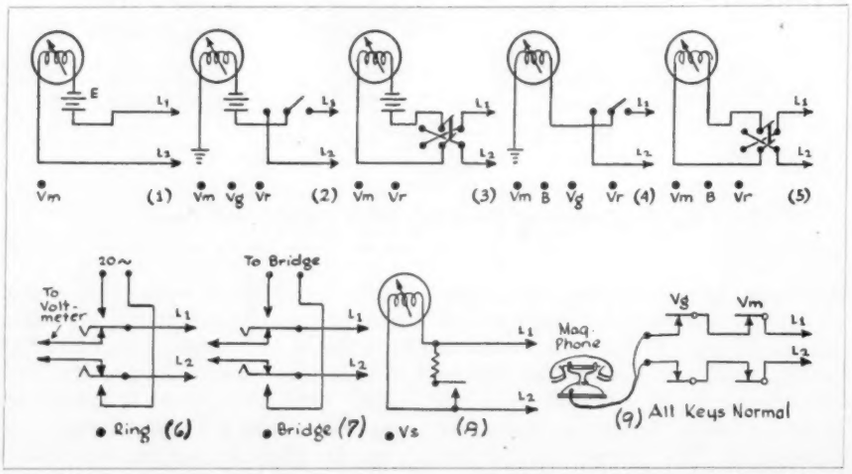


Fig. 7—Various Tests Produced with Different Keys on Wire Chief's Panel Shown in Fig. 6. Note—Black dot shows keys operated. (1)—Test for Shunt Leakage or Line Continuity, (2)—Test for leakage to ground. Reverse key is thrown to give test of both sides of line, (3)—Test of line capacity or for C.B. telephone across line. Voltmeter gives momentary deflection proportional to Capacitance across line, (4)—Test for foreign potential to ground, (5)—Test for foreign potential across the line, (6)—Ringing on line, (7) Key for using bridge, (8)—Shunt key for bridging resistance across meter for low resistance readings, (9)—Connections for use of wire chief's telephone. Note—6, 7, and 8 keys are shown but not operated.

Fig. 1—The brush spraying trailer resulting from the ingenuity and resourcefulness of Muncie, Ind., Plant men Jack Belleau and Ben Russell who started with an idea, two empty oil drums and a few junk auto parts.—(Courtesy Indiana Telephone News.)

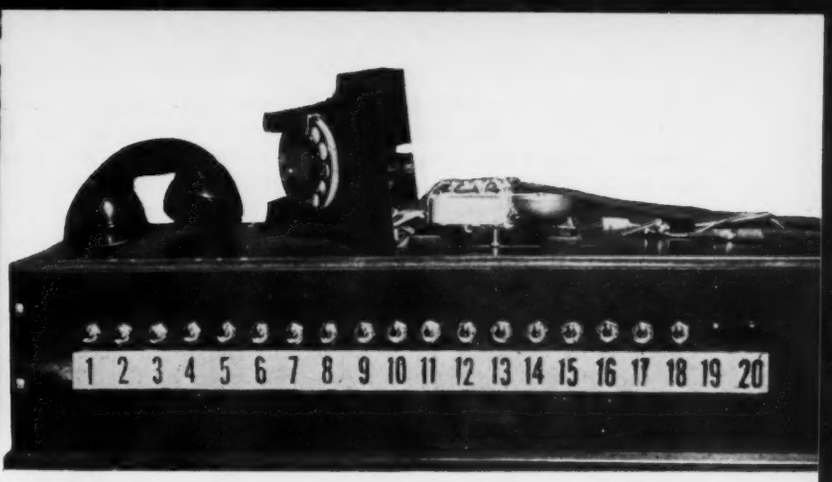


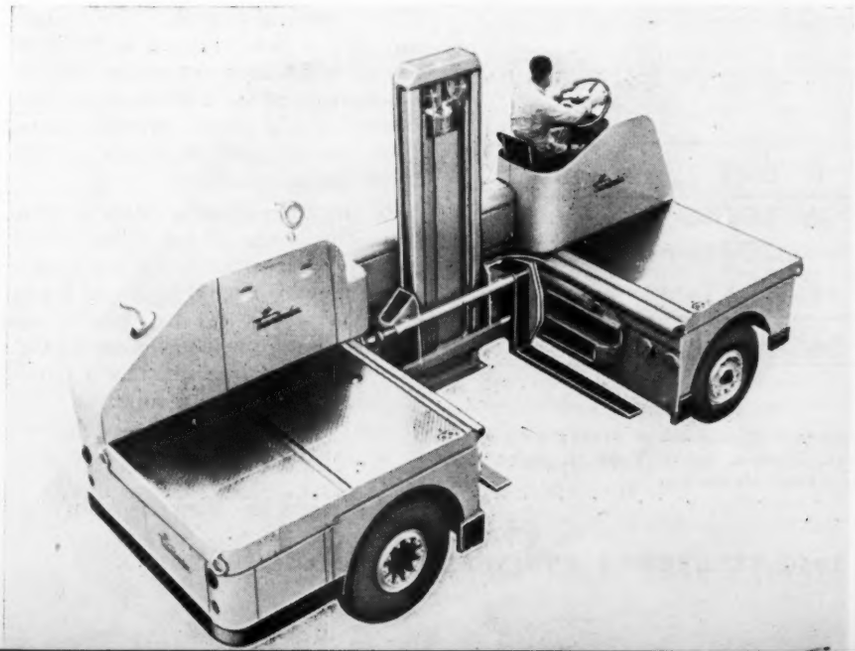
Fig. 2—By pressing button on trouble cabinet, student can reproduce trouble in telephone.—(Photograph courtesy of "The Blue Bell.")

"How To Do It" Suggestions

By John G. Reynolds

Managing Editor,
Telephone Engineer Publications

Fig. 6—The Lull Company Traveloader, showing hydraulic lift and lifting forks in center of truck bed.



A NEW WEAPON in the Plant Department's annual campaign against the threat of underbrush to good telephone transmission has been turned loose in the Muncie District of the Indiana Bell Telephone Co. Credit for this deadly piece of heavy artillery goes to Jack Belleau, building foreman, and to Ben Russell, garage mechanic, who designed and built the new sprayer-equipped trailer at Muncie. (See Fig. 1.)

There was just one catch when they started their project—a lack of material, but to them this was a mere detail. They corralled a couple of empty oil drums and then scoured around for junk auto parts which would meet their requirements.

All of this wasn't as simple as it sounds, but finally they came up with an ingenious and sturdy contraption that is a great improvement over the former method of applying killing sprays to underbrush.

Spraying equipment formerly had to be lifted into the back of a truck and unloaded again when the vehicle was needed for some other purpose. Besides, the limited 50-gallon capacity of the tank associated with the sprayer made necessary frequent interruptions for refills.

Now most any truck can be used on a spraying job by hooking on the trailer. Another big saving in time and effort also is possible through the addition of the oil drums which give the unit a total capacity of 150 gallons.

Trouble Cabinet Used In Station Repair Course

WHILE MOST people maintain they can find more than their share of trouble without looking for it, Plant Instructor G. F. MacEwan,

Bell Telephone Co. of Canada, Montreal, has gone to the trouble of designing a gadget that gives him any one of 18 kinds of trouble just by pressing a button.

The trouble gadget (*Figure Two*) is called a trouble cabinet, and by pressing a button Mr. MacEwan can reproduce trouble in a telephone. The cabinet is 24" long by 14" wide by 6" high. Attached to the top is a combined hand set. A row of 18 buttons stretches across the front of the box.

Wires running from these buttons are cleverly concealed inside the telephone on top of the box. In operation, the trouble cabinet is used by the men taking a two-week station repair course at the Plant School. Eighteen trouble tickets (*Figure Three*) are handed to the student and he is instructed to press one of the buttons to reproduce each case of trouble. The student then is to determine the cause of the trouble reproduced on the telephone.

He goes about this in a methodical manner as the Plant School stresses the importance of methodical trouble analysis rather than a haphazard, hit-or-miss attack. As it sometimes takes as long as four hours to locate and identify the trouble on the telephone, the new trouble cabinet is a boon to the repair student, as a man can sit or stand while using it.

Using the old style trouble board in the Plant School it was necessary for the repairman to stand up at all times as the board was mounted vertically on a wall. It was also necessary to use combinations of jacks and plugs to reproduce the various types of trouble in the telephone.

REPAIR WORK ORDER — B.T. FORM 1369 (3-41)

EXCHANGE MA — ORDER NO. 1

TEL. NO. 5393 — LOC. OR PTY. — CLASS OF SERVICE IR

NAME Lyons, S.R.

ADDRESS 1057 Mountain St. — APT. OR RM. NO. 304

EQUIPMENT HC

ASSOC. TEL. NO. — ADDRESS

CABLE	PAIR	1ST PAIR OR B.P. NO.	ZONE 73A — PROT. YES
10	28	1	HISTORY Nil

TROUBLE REPORTED OR TESTED	TROUBLE FOUND AND WORK DONE
N.D.T.	Open GN Post 101A
Test Rec. Cct.	Ind. Coil.
Open	

TIME ____ A P — DATE ____ 19__

TIME DISP'D ____ A P — TIME O.K. ____ A P — DATE ____ 19__

INSPECTION OMITTED

INSTRUMENT		INSIDE WIRE	X	PROTECTOR	X
OUTSIDE SERVICE WIRE	X	LINE WIRE	X	TERMINAL	X

FORM 732 PREPARED ☐ — SIGNED J. Smith

Fig 3—Number in "Order No." space indicates number of key to be operated by student before making test. Trouble found data is defect student believes to exist following trouble analysis methods.

Southern Bell "Cases" The 'T' Zone

WHETHER YOU climb poles or not you might be interested in this important angle of the telephone business as reported by *Southern Telephone News*. Telephonically the *T-Zone* has nothing to do with inhaling or exhaling, or the brand of cigarette you smoke. It is something up a pole supporting a cable and may be described as an area taking in the pole and the cable and other telephone plant four feet to either side.

In its usual natural state the *T-Zone* looks quite calm and unperturbed, but it is a great source of trouble. Seventy per cent of Southern Bell's preventable cable troubles occur in the *T-Zone*—and that's probably most of the troubles the company has with outside plant, since most of its subscriber lines are in cable, and one cable trouble generally affects a large number of circuits.

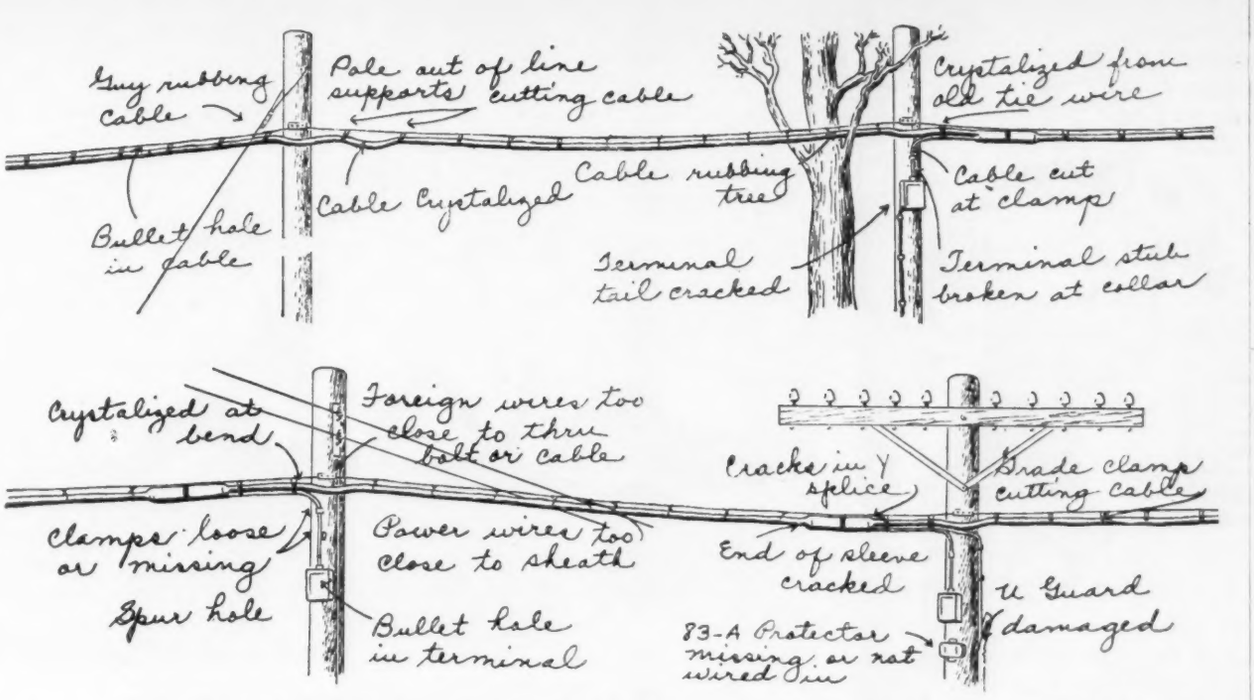
The company's cable is sturdy and durable, but, like most things, it will wear in time, get old and must be given proper care and maintenance for the best performance.

Aerial cable, fully exposed, is subject to damages from many causes. However, their effect can be greatly minimized if the damage is detected before it causes an interruption in service. This is known as preventive maintenance.

And here's a surprising fact. Not only does a defect nipped in the bud not cause an interruption in service and subsequent inconvenience to customers, but it costs generally one-third less as much to repair before it has caused trouble.

All that this effective form of preventing troubles calls for is that every installer, repairman, lineman and cableman look around for possible cable defects as he works, that he inspect carefully telephone plant in the *T-Zone*, and that he report any damage or any potentially defective conditions immediately if he is unable to do anything about them at the time.

This might be called one of the lit-


Guy rubbing cable
Pole out of line supports cutting cable
Crystalized from old tie wire
Cable rubbing tree
Cable cut at clamp
Cable Crystalized
Bullet hole in cable
Terminal tail cracked
Terminal stub broken at collar
Crystalized at bend
Foreign wires too close to thru bolt or cable
Cracks in Y splice
Grade clamp cutting cable
Clamps loose or missing
Power wires too close to sheath
End of sleeve cracked
U Guard damaged
Spur hole
Bullet hole in terminal
83-A Protector missing or not wired in

Figures 4 & 5—"T-zone is important area. Above illustrations show more than 40 cases of trouble in the making.

tle things in a big business, but if every employee who climbs a pole makes this inspection it would protect and improve subscriber service and bring about a savings in maintenance costs.

Just how much plant could be inspected by this method? It's somewhat astonishing. It is estimated that Southern Bell employees climb about 20,000 cable poles a day. At 40 poles to a mile that would be 500 sheath miles. There are approximately 25,000 sheath miles of aerial cable in the company. Thus, if every employee made the *T-Zone* inspection to every cable pole he climbed, it would be the equivalent of five routine inspections of this plant each year. That would catch nearly all the aerial cable troubles before they happen.

It's just another application of the old adage, "A stitch in time saves nine."

Even though *T-Zone* is the most important area to be guarded, constant vigilance must likewise be maintained over other parts of the plant. Principal among these are cable where exposed to trees and foreign wires, cable on buildings and cable possibly damaged by storms.

There are more than 40 types of cable trouble in the making in the *T-Zone*. (*See Figures* 4 & 5.) For instance, cracks in the end of sleeves, in Y- splices and terminal tails; ring cuts, missing rings, stone cuts; bullet holes in cable and terminals, spur holes in cable; power wires too close to the sheath; cable rubbing poles, trees and down guys; crystallized old soldered ring cuts and tie wires; clamp trouble—loose, missing or cutting cable; U-guards damaged by being hit; cracks in terminal face plates and loose terminals; crystallization and strain on cable at bends; sheath abrasions, stone cuts and bruises; misplaced rings allowing cable to bow; missing grade clamps; missing caps on pipes; missing ring in spout strap; dirty terminal face plate.

In general the things that cause cracks and holes in the cable sheath are the source of trouble. Sudden changes in temperature cause contraction and expansion of cable resulting in a breathing action which draws moisture into the cable through these cracks and holes.

Clearing up troubles before they happen not only safeguards service and cuts down repair costs, but it is a matter of considerable personal convenience to employees. With a perversity that one would expect, potential troubles have a habit of becoming real troubles in rainy weather and between 5 p.m. and 8 a.m. Both periods are times when finding troubles and making repairs are the most difficult, the most inconvenient.

Communications

HERE are the 10 commandments of *good* employer-employee communication:

(1) Be sincere; you can't make white out of black; (2) be simple and unaffected in your language; (3) don't overglorify the company; (4) select competent personnel to handle your program; (5) make your communications a top level supervisory responsibility; (6) don't ignore unsavory situations your employes know exists; (7) investigate *all* devices of communications and use all that can help; (8) establish your needs first, *then* establish your budget — not vice versa; (9) check constantly on your communications effectiveness, and, (10) never let your communications program slow down.—From *Modern Industry*.

Material Handling Machine Does The Heavy Work

FOR HANDLING capacity loads of from 3,000 to 30,000 pounds, the new side-loading hydraulic Lull

(*Please turn to page* 44)

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Our announcement concerning RUNZEL "VN" SERIES NYLON CORDS has startled the Telephone industry. Everywhere, in every department of the service RUNZEL "VN" SERIES NYLON CORDS are the talk of the industry.

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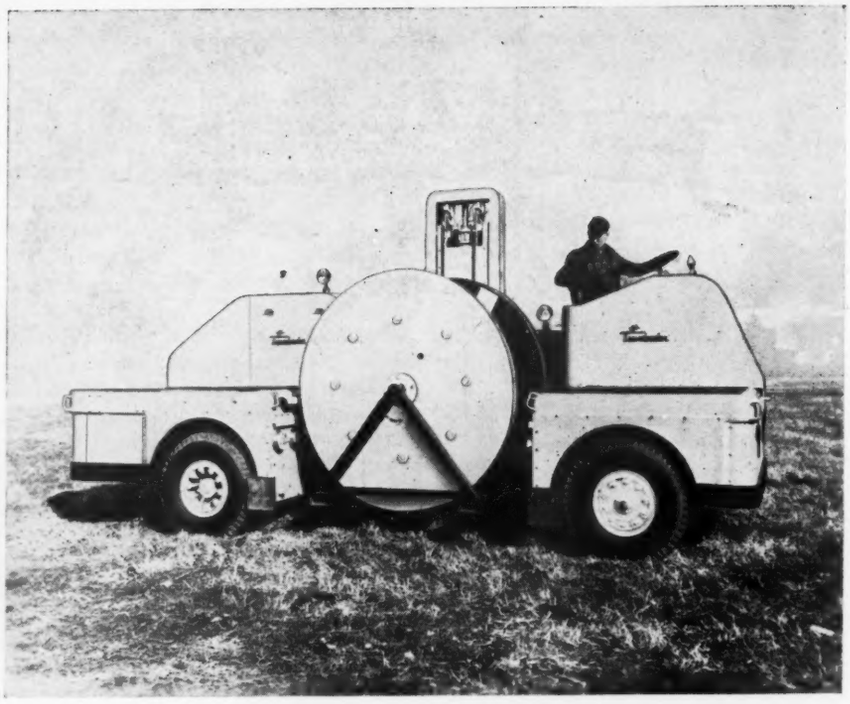

Fig. 7—The Traveloader transporting a reel of cable.

Traveloader, illustrated in *Figure* 6, is said to do the work of two or three conventional machines, and is handled by one man.

The Traveloader performs as a combination motor truck and fork-lift truck. It also does most of the work of the straddle-buggy, the tractor and yard crane. It lifts, loads, unloads, stacks and hauls steel, lumber, pipe, poles, spooled cable . . . anything from a single piece to a capacity load, and from six to 66 feet long.

In operation, a hydraulic lift-tower slides out 72 inches to insert its forks under the load. The load is then brought aboard by hydraulic power, and deposited on the Traveloader platforms. Weight of the payload is distributed equally over two axles and all wheels, with minimum ground pressure on each tire.

Used as a motor truck for short or long runs, the Traveloader carries its own load at speeds up to 30 mph. Unloading itself from the side, the unit needs no space for backing and turning and it stacks to any height from ground level to a deck-stacking height of 12 feet.

With its side-loading feature, the Traveloader can be utilized for straight-line pick-up, carry and delivery from storage yards with aisles only slightly wider than the Traveloader body. Needing no space to maneuver, it can handle all loads over-the-side. This is considered to be a decided advantage in pole yards where space is always at a premium.

One Traveloader attachment is a ram used for picking up, transporting and stacking steel coils. Another is a special power-operated spindle on the lift tower for picking up spooled cable, then braking or reeling the spool as needed while cable is laid in a trench or transferred to an aerial messenger (*Figure* 7). Also available are double cranes, for use with slings, hooks and other rigging. These add 5 feet of working heights to the lift tower.

All power is supplied by one rear-mounted engine, either gasoline or diesel. Power-boosted steering and hydraulic brakes are standard on all but smallest models. Equipment includes a full highway lighting system plus two adjustable spotlights for night work. The Traveloader is available in 10 models and three sizes: 3,000, 10,000, and 30,000 pounds capacity.

Help The Other Fellow

MAYBE you've just licked a tough problem. Or perhaps you're still sweating it out, but have at least explored and eliminated some of the blind alleys. Why not outline your problem with its solution, in a letter to the "How To Do It" department?

Small Company Talk

By Bill Corman

CONSTRUCTION Programs call for the three "M'S"—Money, Material and Manpower. In the final analysis each of these problems depend on a fourth "M" known as management.

HI NEIGHBOR! I took a quick mental look over my home state the other day, and the construction programs, conversions to new types of central office equipment, cable jobs, etc., either started or completed, were frankly surprising. It seems as though everybody and his brother is making big plans, and starting carrying out the plans.

All of this new work, which seems to be spread all over the United States, is going to call for the old familiar three things—the three "M's" and plenty of them: *Money*, *Material* and *Manpower*.

The Money problem we always have with us, but I am not going to talk about that. The Material problem shows some signs of getting worse, but does not appear to be too very tight just at the present, and neither am I going to talk about that. Manpower is something that has been talked a lot about, but with your permission, let's talk about it some more.

Securing Men With Knowledge & Experience

IN THE SMALL telephone company, the problem of securing men with adequate knowledge and experience has always been, and I suppose always will be, a rough one. In the first place a competent and valuable small-company man has to be *a jack of all trades* and *master of all*. We can't afford to hire a different man to fill each job that needs filling. A good small-company man must know cable and cable splicing, central office equipment maintenance, line construction and maintenance, sub-station installation and maintenance, etc., etc. To add to these rather exacting requirements, we cannot afford to pay, in most cases, really top-flight salaries. The combination of those two factors is what makes it so hard on us.

But most small companies have a plant man who is satisfied to take the job on those terms. It may be because he likes the jack-of-all-trades type of a job rather than the monotony of doing only one thing all the time. It may be that he likes the lack of regulation and successive channels of bosses which characterize the larger companies. It may be that he likes small town life in a small town company. Whatever it is, almost every small company has at least one such man. As long as the company goes along in a nice even vein, this man's services are about all that are required, and everyone is happy.

But when a big construction program comes along, it does not take long to discover that something more is needed in the way of manpower. Where this manpower comes from is what I'd like to think about a little with you.

There are several roads by which one may approach the problem, and, here in our own company, we have tried most of them. The first and most simple, is to utilize the manpower you have available to handle the technical work and fill in the rest of the crew with unskilled labor. On the smaller construction jobs, or in large ones spread over a long period of time, this method works pretty well. But as a method it is widely known and its limitations are well recognized, so we will not talk further about it.

Another method which has received wide publicity is to substitute horsepower (machines) for Manpower. This is fine—up to a certain point. Special purpose machinery costs a lot of money, and unless you are going to use it often and over a protracted period of time, you may find that it will not pay for itself during a comparatively short construction program. A ditching machine is wonderful, for example, for putting down buried cable and underground conduit, but what do you do with it when the job is over? Did it save you enough labor to pay for itself, or didn't it? A hole digging rig can dig a hole in a small fraction of the time that a man can dig the same hole by hand, and where you have a lot of accessible holes to dig in a big construction program, you may find that one will pay out. But it is hardly worth the while to set up the rig and take it down again just to dig the one or two holes that will be required to perform ordinary maintenance. I do not think that any of the manufacturers of these machines will get mad at me for saying this, because they don't want to sell anyone a machine that will be a losing proposition. That is definitely not the way to get repeat orders. In fact, if you are thinking of buying some of these machines, get the opinion of the man who makes it—he knows more about it and what it will do and what it will cost than anyone else. Tell him what you want to do with it, and see if he recommends the purchase.

A third approach to the Manpower problem is simply to hire more men. Well, maybe it is not so simple either. First, where do you get them? Next, if they are not already trained, how

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ELECTROX
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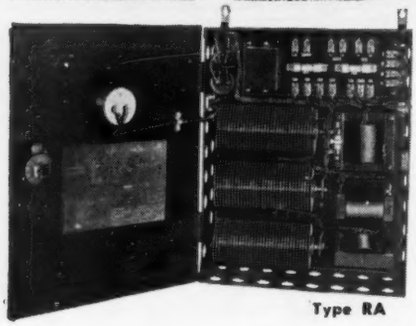


Type RA

MANUFACTURED to the exacting standards of the telephone industry, the Type RA ELECTROX Constant Voltage Battery Eliminator will deliver direct current of suitable smoothness for operating lamp signal and automatic switchboards without the use of batteries.

The Type RA ELECTROX delivers a practically constant output voltage irrespective of current drain up to the maximum output of the rectifier. Constant voltage output is obtained automatically — requires no manual adjustments.

Housed in a ventilated steel wall mount cabinet, the Type RA ELECTROX eliminator requires no attention or maintenance. Simply plug it into your AC power supply and forget it. Available in numerous capacities to supply required DC voltage, with or without power-off relay.

For complete information on the Type RA and other ELECTROX eliminators for the telephone industry, write for Bulletin 1465, or see your Jobber.

RECTIFIER DIVISION
The SCHAUER MANUFACTURING CORP.
2057 Reading Road, Cincinnati 2, Ohio

do you train them, and where do you get the time? And last, provided you solve the first two, what do you do with them when the job is finished? If you will need extra men permanently upon the completion of the construction job, you won't have that last problem, at least for the one or two men you will need permanently, and then they will have the advantage of having worked through your program and will know what is where and how it was put there, which is always a big help in trouble-shooting later on. But the disadvantages of hiring a big crew, training and outfitting it, and then firing it at the end of the job, are obvious to everyone.

There is still another approach. And, surprisingly enough, it is the big companies who have lead the way —and this is contracting. It would be expected that the bigger companies could outfit and train crews, and then move them around from job to job and keep them busy and profitably occupied to a much greater degree than could a small company. And yet, more and more, the big companies seem to be coming to depend on the contractor to do their construction for them. The advantages to the small company are particularly obvious.

When you contract a job, you can get all the advantages of time saving machines, handled by experts. You don't have to embark on a big hiring and firing program. You don't have to set up a training program to train men for a short job. You don't have to buy any construction machinery that will sit around and rust after the job is over. You don't have to gear your job down to the size of materials that can be handled by hand. You don't have to gear your job to the slow pace that would be dictated if you were going to do it all yourself with the few men that you have available. You can know before you start just exactly what it is going to cost—the contractor will assume much or all of the risk if you want him to.

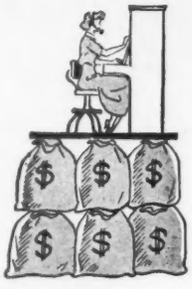
In view of all those advantages, you may ask, "why don't more small companies contract more work than they do?" There are several answers. In the first place, most small companies haven't the necessary backlog of money with which to hire a contractor to do a big job in a short period of time—which is the way the contractor will want to do it—the longer he stays on a job the more it costs him. Companies have found it easier to take a little money this month and add another mile of line, and then next month buy a few telephones, and next month, order the drop wire and installing materials, etc. In fact, that has been about all they could do. Next, good contractors do not come cheap. If he is assuming considerable risk, he is going to charge you for it, and also, he is not doing the job for cost—he must have his profit in the job or he can't afford to take it. Also, contractors want their work to be and look first class. Their standards of construction are probably higher than the average small company demands.

The intense activity of the past few years in the telephone business has probably been without precedent in the entire history of the industry, not even excepting the formative years when the industry was first getting started. The more usual thing for the small company is a series of smaller jobs—a new rural route on the Main Pike this year; a dozen replacement telephones every so often; perhaps a new switchboard every 15 to 25 years; a couple of thousand feet of new cable every five years or so. And under these conditions it is hard for a contractor to bid on such small jobs, even a small contractor.

The last suggestion as to a solution of the Manpower problem is one that probably every small company knows, and has used—borrow the men for a short time from a larger nearby company. Sometimes you can get men who are anxious to earn some extra money on their regular vacation from the larger company. Sometimes you can find a man retired from one of the larger companies who still has considerable valuable work left in him. Sometimes you can get outright loans, and pay, not the man, but the company for the man's time, and he stays on their payroll.

Actually, in most small and medium sized companies, not one, but a combination of most or probably all of the above methods will, from time to time, be used to solve the manpower problem. In my own company, we have used every one of them, as the occasion demanded, and each has its peculiar advantages and disadvantages. Within any particular company, the main consideration should be to plan the thing far enough ahead so that the best method or methods can be taken advantage of. Lack of adequate planning will leave you in the hole at the last minute and you will be forced into a method more expensive or more time-consuming than would have otherwise been necessary. In the end, the Manpower problem comes right back to the fourth big "M" just as do all your other problems, and that fourth big "M" is "Management".—THE END.

"Financing construction through the sale of securities may be the easiest thing in the world, and again it may prove the most difficult, even impossible."



THE MARKETS for NEW CAPITOL

"MAINTENANCE OF CREDIT in the securities market depends fundamentally on the provision of adequate earnings. In a regulated industry, such as a telephone utility, this depends on obtaining adequate service rates."

Albert W. Kimber
Financial Consultant
Washington, D. C.

FINANCING CONSTRUCTION through the sale of securities may be the easiest thing in the world, and again it may prove to be the most difficult, even impossible. It depends primarily on one simple factor, maintenance of credit.

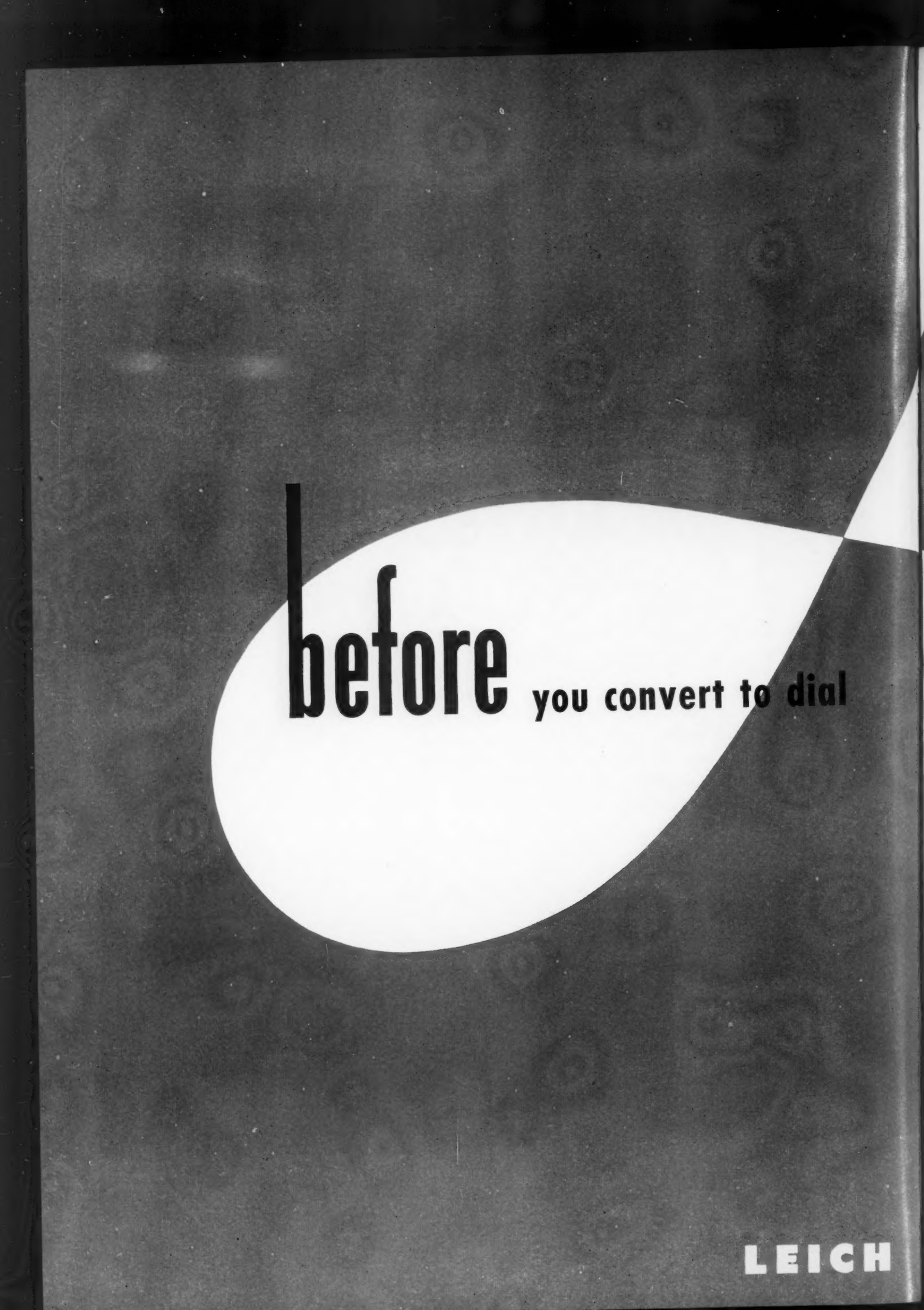
Maintenance of the credit of any corporation in this sense means, of course, maintenance of a favorable attitude towards the company's securities in the capital markets in which they are outstanding. The natural market for new securities of any company is its own bondholders and stockholders. Common stockholders expect that dividend payments and earnings coverage will continue in at least the rates and percentages current when they bought the securities, and that market prices for them will be reasonably stable.

As times change common stockholders will expect their company to pay dividends commensurate with dividends being paid by other similar or competing companies. This means, among other things, that if the dividend pay-out for a few years has been at the rate of 50% of available earnings, and other similar or competing companies are paying out 70%, the company paying out 50% may have to revise its policy. Stockholders will also expect the dividend coverage in available earnings to be commensurate with what is being provided by such other companies. Stocks are more or less liquid assets, satisfied holders are inclined to buy more of them, thus the market price advances; while dissatisfied holders are inclined to sell and reinvest in something which they think will be more satisfactory. If common stockholders are satisfied the holders of bonds and preferred stock will also be content. If earnings are sufficient to support a market standing for a common stock, income coverage for the bonds and preferred stocks will be adequate to qualify them as high grade, or at least semi-high grade securities.

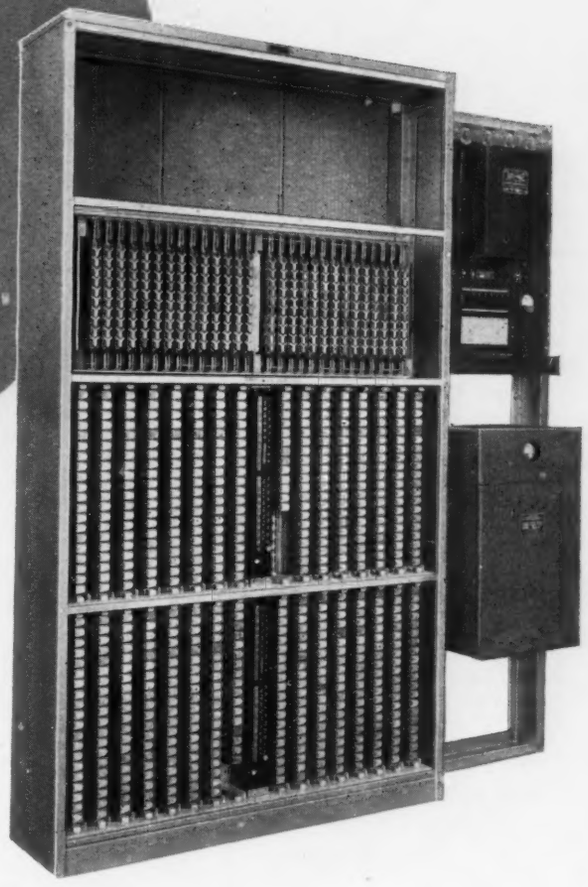
Where bonds are privately held, the holding institutions may be more understanding and even indulgent than holders of preferred or common stocks, but even such bondholders become concerned if the earnings coverage for their interest payments begins to slip.

Thus maintenance of credit in the securities markets depends fundamentally on the provision of adequate earnings, and in a regulated industry, such as a telephone utility, this depends more than anything else on obtaining adequate service rates. In these days of increasing costs of all kinds the prospect of decreasing earnings can easily be foreseen, and with such a prospect steps should immediately be taken to arrange for service

(*Please turn to page* 50)


before you convert to dial
LEICH

talk with the owner of a Leich Dial System near you . . .



Tell this man your intentions of converting to dial. Ask him how he likes his Leich Dial System. Ask him if it really is simpler and easier to understand and operate. Ask him if his customers like the service, if the Leich Dial System fills every service need. Ask him also, if his Leich Dial System was quickly and easily installed as Leich claims it can be. Ask him if he has any complaints about its performance. Ask him if it's as easy and inexpensive to add to the capacity of the Leich dial board as you understand it is.

Ask him if he has had any experience with any other type dial switchboards and how the Leich Dial System compares with them. Ask him if he can see where and how the Leich System is helping him make more money than he made before.

Ask him frankly, if he thinks he's made a practical and *profitable* investment. Ask also, if Leich hasn't lived up to their delivery schedule and all other obligations one hundred per cent.

Write us. We'll be happy indeed to tell you the location of the Leich Dial System nearest you. Leich Sales Corporation — 427 W. Randolph St., — Chicago 6, Illinois.

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

Table One—Telephone Company New Capital Issues June-August 1950

Bonds and Debentures	Amount	Price	Yield %
June 1950			
Bell Telephone of Canada (See Note) 1st 2½% H May 1, 1960	$8,000,000*	101.778	2.30
Home Telephone (Ridgway, Pa.) 1st 3.50% 1967	300,000*	102.722	3.30
Inter County Tel. & Tel. (Fla.) 1st 3.15% 1973	431,000*	101.50	3.10
Kern Mutual Telephone (Calif.) 1st 4% 1975	175,000*	100.00	4.00
Northwestern Bell Telephone Deb. 2.75% 1984	60,000,000	101.107	2.70
Tidewater Telephone 1st 3.125% C 1967	250,000*	101.00	3.03
July 1950			
Harrisonville Telephone (Ill.) 1st 4.25% A 1970	150,000	103.375	4.00
Interstate Telephone (Idaho) 1st 3.25% 1974	750,000*	103.43	3.05
Southeastern Telephone (Fla.) 1st 3.125% 1975	1,300,000*	100.00	3.125
Geneva Telephone Co. (Ohio) 1st 3.25% 1964	25,000	101.75	3.10
Southland Telephone (Alabama) 1st 4% 1975	165,000*	100.00	4.00
August 1950			
Avalon Telephone Co. Ltd. (Nfd) 1st 4% 1969	500,000	100.00	4.00
Investors Telephone (Chicago) Coll tr 3% 1980	4,500,000*	100.00	3.00
Mutual Telephone (Honolulu) 1st 3.125% G 1980	1,000,000	102.46	3.00
Mansfield Telephone (Ohio) Deb. 2.90% A 1975	1,100,000*	100.00	2.90
Rochester Telephone (Indiana) 1st 4% 1975	100,000	100.00	4.00
Hooper Telephone (Nebraska) 1st 3.75% 1970	30,000	102.00	3.60
Indiana Associated Telephone 1st 3% 1975	400,000*	100.00	3.00

Preferred Stock	No. of Shares	Price	Yield
June 1950			
Associated Telephone Ltd. (Calif.) 5% Pfd. $20 par	125,000	21.50	4.65
Home Telephone (Ridgway, Pa.) 5% Pfd. $50 par	2,500	50.00	5.00
Florala Telephone (Ala.) 4% Pfd. $25 par	1,200†	25.00	4.00
July 1950			
Mutual Telephone (Honolulu) 5.10% Pfd. $10 par	100,000	10.00	5.00‡
August 1950			
Indiana Telephone 4.80% Pfd. $100 par	3,000	100.00	4.80
Common Stock			
June 1950			
Tidewater Telephone Com. $20 par (1.20)	10,000	21.00	5.71
Mutual Telephone (Honolulu) Com. $10 par (0.80)	30,048	11.75	6.67‡
Home Telephone (Ridgway, Pa.) Com. $50 par (3.00)	1,500	50.00	6.00
July 1950			
General Telephone Corp. Com. no par (2.00)	199,350†	25.00	8.00
Western Carolina Telephone (N. C.) Com. $50 par (3.00)	1,406	50.00	6.00
August 1950			
Central Telephone (Neb.) Com. $10 par (0.80)	94,035†	10.00	8.00
Rhinelander Telephone (Wisc.) Com. $1 par (4%)	100,000†	1.00	4.00

Note: Bell Telephone of Canada 2.50% 1960 are payable in U. S. dollars and were placed with institutions in the United States.

*Private Sale ‡After Hawaiian 2% tax withholding †Offered to stockholders

rate increases which will produce the required available income. And regulatory commissions, most of them at least, are no longer so reluctant to grant rate relief to independent telephone companies as they formerly were.

When additional capital is required, determination of the type and relative amounts of new securities to be sold should present few problems. If existing capitalization is unbalanced, advantage may be taken of the opportunity to arrange the new issues in such fashion that a sound capital structure will result. The classical balance of 50% debt, 25% preferred and 25% common stock equity (including surplus) attributed to the Securities and Exchange Commission, may be tolerated for some of the larger telephone utilities, but it is not suitable for the average company, nor for the smaller companies or those which serve a comparatively small area, largely rural, or a number of different disconnected areas. For most telephone utilities a safer balance is 40% debt, 20% preferred, and 40% common equity.

The reason for this is that a margin of safety must be provided for dividends on the common stock. A glance through any relative statistical publication shows that even last year some of the smaller electric and telephone utilities reported net operating income, that is cash income, approximately half only of the 1948 figure. Any one can easily calculate what such a development will do to the earnings for the common stock if the company has debt and preferred obligations which make too heavy a draft on the income available for capital charges.

Debt capital is so easy to obtain that the subject might appear to call for little comment, but it does. Most independent telephone utilities find it convenient to place their bonds at private sale, because this method avoids some of the troublesome work and costs of public offering. But there are times when suitable institutions are uninterested in small issues of small companies, or insist upon terms that are too burdensome. In such cases public offerings can usually be arranged, and if they do not exceed $300,000 in principal amount, at comparatively small expense. Our Table One includes two such little offerings, $25,000 for Geneva Telephone Company and $30,000 for Hooper Telephone Company, underwritten and offered by old established bankers in Ohio and Nebraska respectively. Public offering

(*Please turn to page* 62)

THE 53RD ANNUAL Convention of the United States Independent Telephone Association is going to be a record breaker.

It gives promise of shattering all previous attendance records.

It is going to set a new high for quality in business and social programs.

Able, well-informed, dynamic persons for industry and from public life will discuss some three dozen topics ranging from What is Ahead in Independent Telephony to Depreciations as a Factor in Rate Making, from The Impact of Defense Preparation to the Theory and Use of Electronic Insulation, from A Year Under the R-E-A Telephone Lending Program to Automatic Toll Ticketing.

The national meeting of Independent men and women will open at the Stevens Hotel in Chicago on Monday, October 9 and continue through Wednesday evening, the 11th. On the latter evening the annual banquet and entertainment will provide a fitting capstone to a constructive seminar on a program of business and entertainment that your children and grandchildren will read about in the industry journals in years to come.

At four general sessions—Tuesday and Wednesday mornings and afternoons—there will be addresses and discussions of varied topics of interest to everybody including executives, management heads, department heads, supervisors, operators and all other good telephone people. The four technical conferences—Plant, Traffic, Commercial, Accounting—will be conducted on Monday, with the Plant Conference running a full day.

Here's a birds-eye view of the varied matters that, among others, will be covered by qualified speakers at the general and technical sessions:

What Is Ahead In Independent Telephony?

Your Affairs in Washington.

Radio and Its Legal Implications to Independent Companies.

Telephone Communication In a New Era.

Problems Common to All Public Service Enterprises.

The Relation of Telephone Companies To Priority and Allocation Controls.

A Year Under the R-E-A Lending Program.

Essentials of Open Wire Transpositions and Drop Wire Usage Trends.

Defense Planning and Coordinating.

This New Technology Called Radio and Its Use in Our Industry.

The Impact of Defense Preparation.

An Operating Man Speaks His Mind.

American Free Enterprise in The Defense Effort.

Plant Committee Participation In Washington Activities.

Trends in Joint Use of Poles.

Improvements in Pole Line and Conduit Construction.

Features of Cable Construction and Maintenance.

Theory and Use of The Electronic Insulation Testing Unit.

Consideration of Some Dial Conversion Problems.

Toll Line Dialing.

An Independent Company Gauges Its Service.

Capitalization of Overhead Applicable to New Construction.

Operator Qualifications.

Employee Morale is Important.

Report on New Techniques and Equipment.

Recent Developments in Carrier and Radio Equipment.

Activities of Committee on Radio Service.

Automatic Toll Ticketing.

Simplified Method of Force Adjustment.

Depreciation As An Accounting Factor in Rate Making.

Modern Stockholders' Reports—Their Mission.

How Are Your Customer Relations?

Commercial Service Standards.

Here is enough to challenge the curiosity of the average telephone man and woman. It is a formidable array of eye-arresting, appealing items.

The names of speakers will be announced as soon as acceptances of invitations have been received.

Our Independent manufacturers and suppliers will be on hand throughout the Convention. They will be prepared to discuss your supply and equipment problems with you. The fifth floor of the Stevens Hotel will be one of the most popular places, for it is there that every room will be used to display exhibits of the latest in technology and design. It is on the fifth floor also that our Plant Committee will have a room where consultation can take place with members of the Committee concerning various technical features that will be on the agenda of the one-day Plant Conference on Monday.

The Pioneer Hour on Tuesday

(*Please turn to page* 54)

When you buy STROWGER AUTOMATIC-

This COMPLETE range of services protects your investment

FIELD ENGINEERING

First step in solving many operating problems is a detailed study of exchange traffic. Automatic Electric field engineers give expert advice on such studies, and can supply automatic recording equipment to assure accurate results with a minimum of labor. Dependable, accurate traffic and other operating data enable Automatic Electric engineers to provide exactly the correct amount and types of switching equipment.

It is natural for hundreds of telephone companies to turn to Automatic Electric whenever there's an equipment problem to be solved.

And there's a good reason. For what makes Automatic's equipment service so distinctive and so valuable to operating companies is that it includes so much more than the bare supply of switchboard equip-

"TAILORED" EQUIPMENT

Every Strowger Automatic switchboard is individually engineered, and is equipped to meet the operating and service requirements of a specific exchange. Strowger Automatic exchanges can be "tailored" with such accuracy because of the small-unit construction of Strowger Automatic equipment, and the wide variety of equipment units availble to meet every need.

SUGGESTIONS ON OUTSIDE PLANT

When your problem involves re-arrangement or extension of your outside plant, Automatic's experts in that field will be glad to make their recommendation. They're alert to the latest construction methods for town and rural lines —or can advise you on the most efficient means of handling toll traffic, including the most modern techniques in carrier and radio.

STAFF TRAINING

For more than forty years, Automatic Electric has helped in the training of telephone company technical personnel. Textbooks are supplied for "on the job" study; or selected employees may be sent to the Training School at our factory, where complete facilities and expert teachers are available without cost to the telephone company.

INSTALLATION

Our experienced field installers are prepared to handle the complete installation of all central office equipment, including automatic switchboards, power equipment and manual positions. Every step, from floor plan through erection, cabling, wiring and testing, receives the most expert care to insure sufficient and successful operation.

OPERATING ENGINEERING

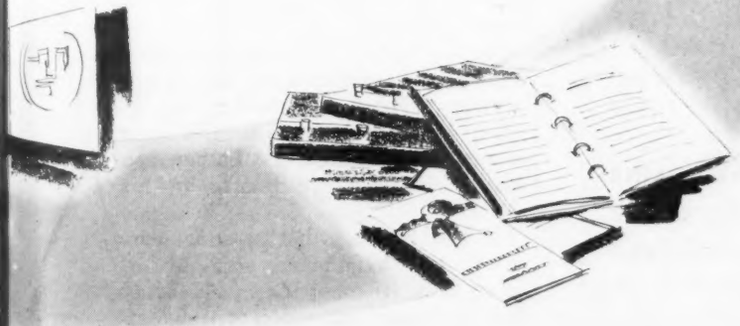
Throughout the long life of your Strowger Automatic equipment, specially trained operating engineers will be at your call, to consult with you on any phase of your exchange operation. In addition, at the appropriate time prior to issuance of the new directory, they are available to make recommendations on "number assignments" so that your new equipment will be utilized to greatest efficiency.

ment. With every purchase goes a wide variety of other services which are vital to a complete and successful installation — services which are made possible through Automatic's long experience in meeting every type of field requirement.

When you buy central office equipment, be sure that your investment is protected by such services as those listed here. All of them are regularly available to purchasers of Strowger Automatic equipment.

SUBSCRIBER EDUCATION

Many telephone companies take advantage of community interest in the installation of automatic equipment to educate subscribers in the functioning of the equipment and the operation of the automatic telephone. For this purpose, Automatic Electric is prepared to supply portable demonstration units which may be placed in the telephone company's offices or in other public places for demonstration to, and operation by, the telephone users.



RATES AND FINANCING

Modernization of telephone facilities often involves arrangements for financing, by borrowing or by sale of equities, and for rate adjustments where indicated. Automatic Electric is prepared to advise in such cases in the setting up of proper accounting records and in preparation of the data required for financing and for presentation of rate cases before regulatory authorities.

AUTOMATIC ELECTRIC

inators and Developers of the Strowger Step-by-Step "Director" for Register-der-Translator Operation . . . Machine Switching Automatic Dial Systems
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The Best Way
to get all three to the job —
MEN..MATERIALS..EQUIPMENT

NEW HIGHWAY UTILITY TRUCK BODIES

This is the kind of public utility truck body that Highway engineering, design, and production facilities can turn out to do a better job for you.

It carries five men to the job comfortably, plus all the material and equipment needed for line construction and maintenance work.

It can be customized to incorporate *your* ideas, or purchased as you see it here.

TELL US YOUR NEEDS — LEARN ABOUT THE HIGHWAY LINE

We build all types of utility trucks—for general or special service of all kinds. Tell us your needs and we'll show you how to get low operating costs with Highway's quality construction for long service life. See your Highway representative, call, or write

***HIGHWAY* TRAILER COMPANY**

Headquarters: Edgerton, Wisconsin

PLANTS AT EDGERTON, WISCONSIN — STOUGHTON, WISCONSIN
CINCINNATI, OHIO

Manufacturers of Utility Truck Bodies • Earth Boring Machines • Pole and Cable Reel Trailers • Winches • Power Take-offs • Service Accessories

Distributors will be interested in the new Highway Franchise

USITA's 53rd Convention

(Continued from page 51)

afternoon following conclusion of the U-S-I-T-A business session will be a high spot. At that time the Independent Pioneer Telephone Association will put on a characteristically fine program of entertainment for its members and for you.

Yes, this 53rd Annual Convention is going to be outstanding in many ways.

Here are eight reasons why you should be with us at the Stevens Hotel on October 9-10-11:—

Here will be found springboards for future discussion, and a momentum that will carry you many steps further. One idea will give birth to another. There is a chain reaction. Let us expose ourselves to the spark that sets these in motion.

Here is a post graduate course in the art of telephony.

Here is an opportunity to receive the benefit of information and ideas advanced by the best minds of the industry.

Here is an opportunity to obtain inspiration, a broadened perspective.

It is sometimes said there is no easy road to the acquisition of knowledge. But here is an opportunity to acquire a substantial fund of it just by coming and listening.

It is in your interest to find out how the other fellow does the same job. The competition in the intellectual market of the day points to a very practical moral.

An author of a recently published book on Economics and Public Utilities says, "Man works most effectively when he knows with certainty the manner of procedure of all other men whose activities are related to his own."

It has been said that great achievements are lengthened shadows of great men. It is not too much to say that immense assistance will be afforded to those daily on the firing line by the technically informed men, the men of breadth of economic knowledge, the qualified men who themselves were helped by their contacts with others,—who will participate in this Association's 1950 Convention program.

This U-S-I-T-A annual gathering is going to be a great meeting. It is the "must" meeting of the year for Independent telephone men and women.

Make your hotel reservations now!

QUESTIONS and ANSWERS

IN THIS ISSUE, Mr. Mitchell answers questions pertaining to—(1) Portable common battery extension telephone service with plug-in jacks for magneto office subscribers; (2) instruction book on transpositions, phantoms etc., and (3) battery room care and ventilation.

PROBLEM: SOLUTION:

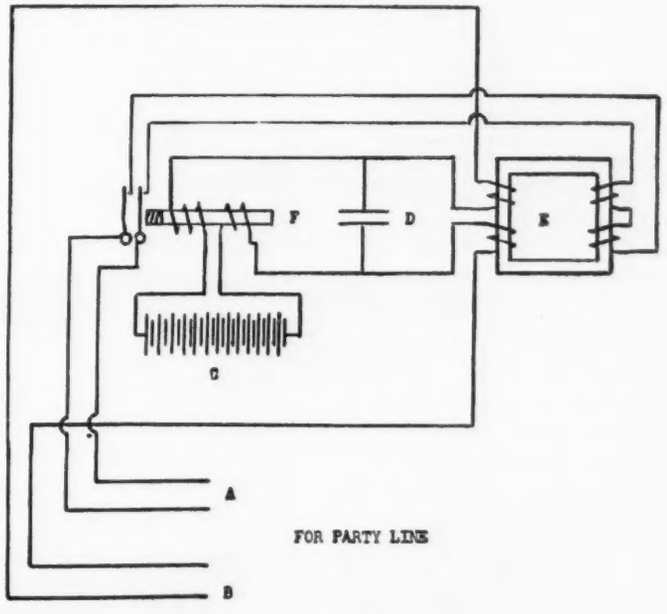
By Jay G. Mitchell

Question: We have a subscriber who would like to have a telephone they could carry from room to room and plug it in anywhere they wish. We have a magneto system but believe this case would call for a Common Battery Telephone with a kick coil arrangement. Could you give us complete details about how such a hook-up could be made and also where we could get the necessary parts for the same? The telephone they now have is a Leich 655 A push-button and can be made to do. What kind of a plug and jack would you recommend?

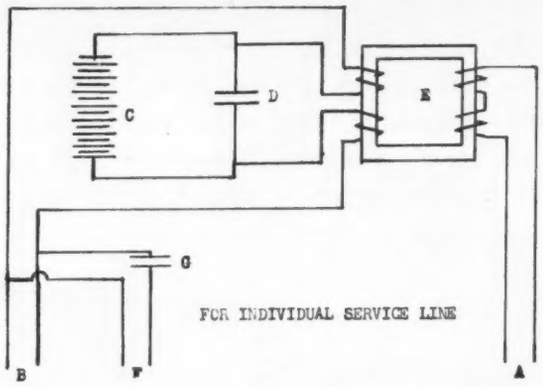
We have another problem that seems to be troubling the small magneto exchanges in their efforts to modernize their old telephones. Our subscribers like handset telephones and we don't blame them, but when we look at the prices the manufacturers ask for handsets with four conductor cords we are hard put to try to use the three conductor kind in an effort to get by. The sorry part of it is that they won't work right. Aside from buying handsets with three conductor cords and replacing with four conductor cords can you give us any suggestion as to how we can use them to as good advantage as the higher priced kind? Most telephones that we would use them on are the old type Kellogg wall telephones with the long switch lever. Some do have the short hook switch lever but as far as I can tell their hook-up is about the same. Could you give us a diagram for changing the wiring or rewiring these so that we could use a three conductor handset and a three spring two make hook switch? Most of the generators are of the three spring contact type. We enjoy your QUESTION AND ANSWER department and read it every time. Would like to see an article soon on the metalicizing of old long grounded lines. We have some that will have to have that treatment soon as the R.E.A. is bothering our lines more and more. Any suggestions that you can give us will be gratefully received. Stamped and directed envelope is enclosed for your reply.

Answer: This inquiry is in reality two interesting, for the magneto telephone system, questions. Before discussing the circuit arrangement which will permit a subscriber in a magneto telephone office to be given this kind of service, portable telephone with multiple plug-in line jacks at several locations in his premises, it would be well to secure authority from the COMMISSION in your state, if it has not already been done, for an additional or entirely new and higher monthly charge for such service. It would also be well to do this because if one subscriber is supplied with this improved portable telephone service others are likely to demand it and they should all pay more for this service than the regular rate for an extension. The rate should consist of two parts, one of a rate for each jack installed and one for each portable telephone instrument supplied.

The suggested circuit arrangements are shown in the sketches. When the portable extension is to be used by a subscriber having an individual line circuit with straight metallic ringing and at least 1,600 ohm ringers the kick coil may be inserted in the telephone circuit toward the central office ahead of the permanent telephone instrument as shown. The jacks



A-Magneto telephone circuit to central office
B-Telephone circuit from repeating (kick) coil to plug-in jacks for portable C.B. telephone
C-30 volt dry battery
D- 4 mfd. condenser
E-Repeating (kick) coil
F-Slow release relay



A-Magneto telephone circuit to central office
B-Telephone circuit from repeating (kick) coil to plug-in jacks for portable C.B. telephone
C-24 volt dry battery
D- 4 mfd. condenser
E-Repeating (kick) coil
F-Telephone circuit to permanent telephone
G- 2 mfd. condenser

for the portable extension and the main telephone instrument, in such cases, are then bridged directly on the secondary terminals of the kick coil which acts as an ordinary repeating coil on *all calls* while providing means for the removal or replacement of the receiver of the portable extension when plugged into one of the extension jacks to kick down the drop at the central office.

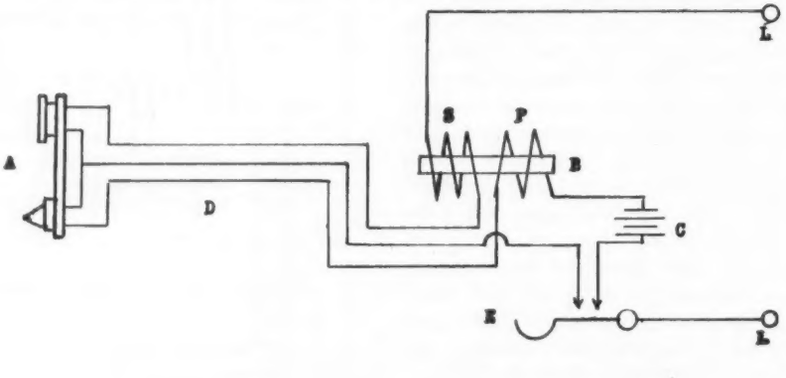
When some form of selective ringing is used it is necessary to disconnect the kick coil and associated equipment from the line circuit *except when the common battery portable is in use* and to connect them to the line automatically whenever the portable common battery extension is to be used. This disconnect and connect function is done by the relay shown in the sketch which has two normally open make contacts and two balanced windings of 100 ohms each. In this case, because of the presence of the relay winding in the battery supply circuit for the portable common battery telephone, it is advisable to provide a battery of twenty dry cells delivering about 30 volts. The parts required for either of the two suggested circuit arrangements can be purchased from any manufacturer of telephone equipment. In ordering it will be necessary for you to specify very clearly how the equipment ordered is to be used, however, to insure that you receive the exact items needed. The double wound relay with two balanced windings should preferably be of the slow release type.

The matter of remodeling conventional wall type magneto telephones for use with the so-called cradle type or hand telephone is best done in a factory but the circuit in which a three conductor cord type of hand set is used is shown in the sketch from which the generator and ringer have been omitted. It will be noted that the induction coil in this circuit has *four* terminals. The induction coil in the usual wall type of magneto telephone has only *three* terminals one terminal serving for access to one end of both the primary and secondary winding. The separation of these two windings at the terminal on which they are both soldered and the installation of another terminal for the fourth wire is somewhat difficult and requires the utmost care which is the reason that this modification can best be made in a telephone shop.

The double wound relay with balanced windings shown in the sketch circuit could be replaced with a single wound relay insofar as the connection to the telephone circuit of the plug-in jacks for the portable common battery telephone instrument is concerned. In case some deterioration in the dry batteries should result in a ground connection, however, the balanced double wound relay would effectively preserve the balanced circuit to the repeating (kick) coil windings and might prevent the occurence of an undesirable transmission condition.

Question: In your QUESTION AND ANSWER column in TELEPHONE ENGINEER AND MANAGEMENT, issue of December 1, 1949, you recommend that one of the inquirers purchase a book treating of transpositions as they concern a small exchange. Would you recommend such a book? Also I have been looking for a discussion of phantom circuits, such as a service man for a small exchange would write to say nothing of tests as applied to line work, induction coils and transmitters. This information seems to be difficult to obtain and what is available is design rather than tricks of the trade that are so convenient to know in any line of work.

Answer: This inquiry is difficult to answer and I suggest that the writer consult the list of books for sale by TELEPHONE ENGINEER PUBLISHING CORPORATION that



MAGNETO WALL TELEPHONE SCHEMATIC FOR THREE CONDUCTOR CORD AND HAND TELEPHONE — GENERATOR AND RINGER OMITTED

A-HAND TELEPHONE
B-INDUCTION COIL (ENLARGED TO SHOW FOUR TERMINALS)
C-TELEPHONE BATTERY
D-THREE CONDUCTOR CORD
E-HOOK SWITCH
LL-LINE TERMINALS

P-PRIMARY WINDING
S-SECONDARY WINDING

is published from time to time and make his own selection. It must be understood that several books may be required to give the specific information desired because the inquiry seems to cover both the theory and practice of telephony. The "*Handbook For Telephone Managers And Engineers*" in two volumes, I and II, by B. C. BURDEN seems to come nearest to supplying the information desired. This set of two volumes is for sale by TELEPHONE ENGINEER AND MANAGEMENT, the price being $3.00 per volume, postpaid. I recommend this work for your use as I interpret your problem.

Question: I have a problem I wish you would help me on. We have several (11) wet batteries located in the basement of our exchange and we have fumes or an odor coming up through the registers of the oil furnace, both in winter and summer, and this odor is offensive when closed in a room where it blows directly onto one and the odor is likened to that from a horse barn to some extent.

Can you tell me just how dangerous this may be to the health, if left in this condition, or how much it may have affected the health in one years time? Would it not be better if the batteries were moved upstairs into a room that could be shut off from the rest of the building?

Answer: This inquiry is not entirely clear because the type of the batteries is not specified. As to the effect upon the health of fumes from a battery room this cannot be answered because it borders upon the field of medical advice and should be referred to a physician who can evaluate all the factors involved. If the batteries that are causing this condition are storage cells of the lead-lead type the fumes are a normal result of the charging operation and should not be confined in any space which has no facilities for ventilation.

It is suggested that you consult your furnace dealer with the object of arranging for the installation of your battery in a separate room which can be ventilated without passing the bat-

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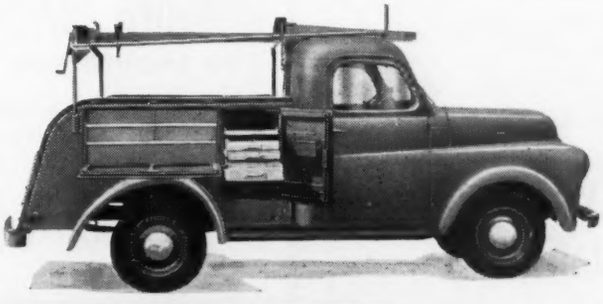

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tery fumes into the space from which your furnace draws the supply of air for heating. If you have a chimney flue which has a good draft and can install your battery in a closed space to which this flue can be connected you will probably bring about the relief from this very annoying condition. Every storage battery room should be well ventilated either as suggested, by means of a flue and natural draft, or by the installation of an electric fan which will draw out the vitiated air from the room constantly. If your battery is not a storage battery the same remedy should be adopted although the fumes from primary batteries are not ordinarily seriously inconvenient. It is also suggested if the offending battery is a storage battery that the interior of the battery room be thoroughly painted over with a good coat of asphaltum varnish and that all exposed metallic places be most carefully covered. Asphaltum varnish is a fairly effective protective covering for metal exposed to the fumes from charging lead-lead storage batteries.

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IF POLITICAL and economic trends have demonstrated anything at all during the past decade and a half, they have proved that management executives have new responsibilities beyond those normally associated with management. What are these new responsibilities? The first is to participate actively in politics. The businessman as an individual must become vitally interested in politics at every level from the municipal to the federal, making his convictions felt at every stage.

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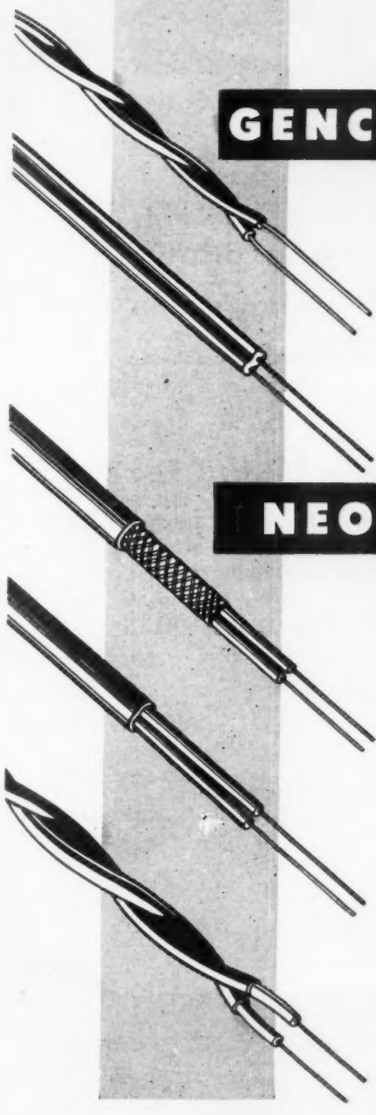

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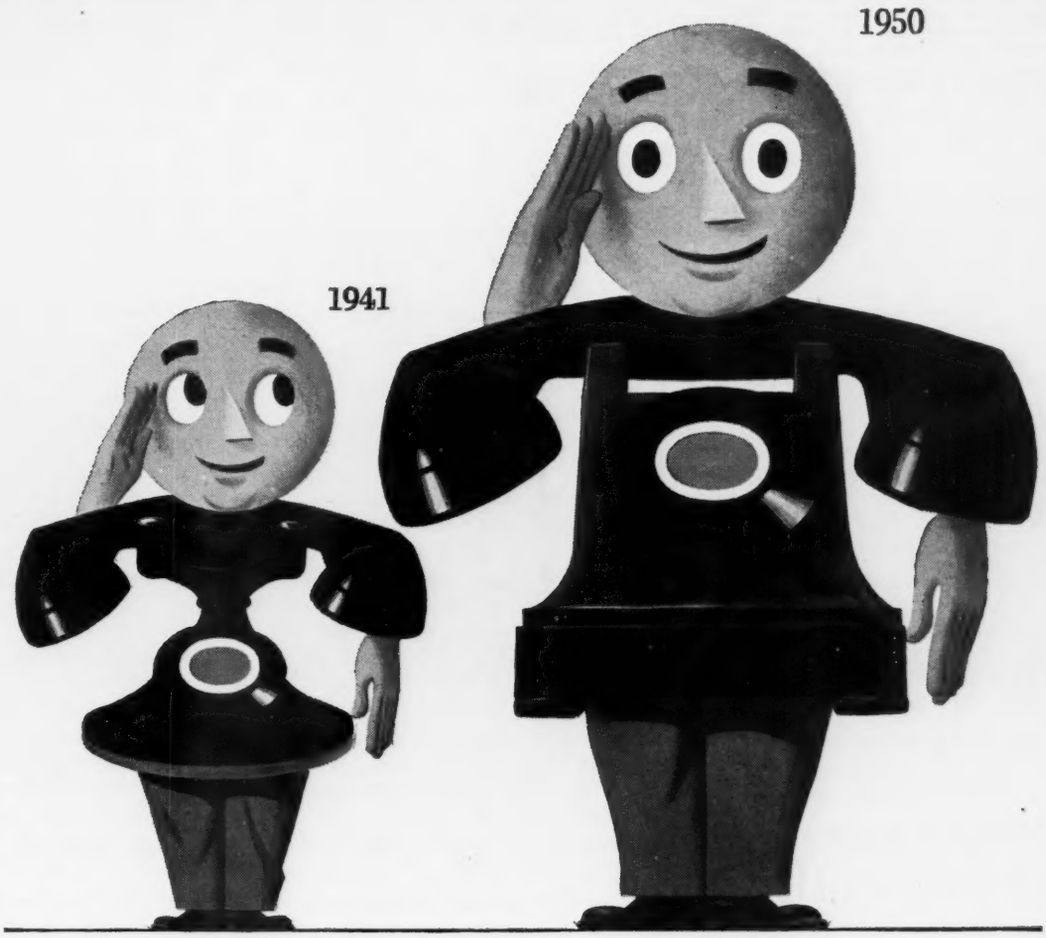

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Money Markets

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(*Continued from page 50*)

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has this advantage, that it creates an interest among the investing public and in the office of a security dealer which may be of great help in maintaining the credit of the issuing company.

Bank loans increasing over a period of one or two years and intended to be paid from proceeds of long-term bonds or other securities at a later date, involve market risks that can be avoided. At such later date it may prove to be imposible to sell the long term securities. Perhaps the best method of raising debt capital is that used by New York State Electric & Gas Corporation, announced August 31; company sold three insurance companies $12.5 million of 2.80% bonds, the loan to be drawn down at intervals of two months in three installments of $3 million each with final $3.5 million. This method guarantees the utility that it will get all the debt capital cash it needs, without having to pay interest on funds before they can be used, and without a standby interest charge. If one institution will not do business on these terms, another will.

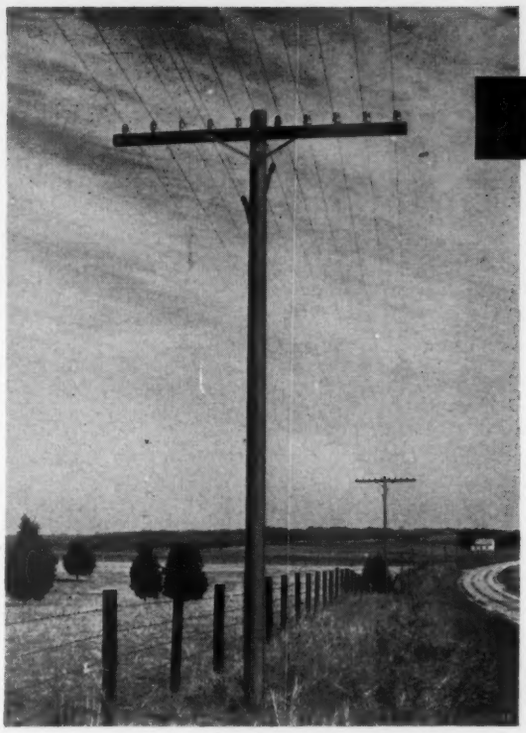
The worst possible way to obtain debt capital is through a contract which binds the borrowing company to repay the debt through heavy periodical installments. For example, the little Gulf Service Company of Alabama was recently authorized to obtain a loan from banks in the amount of $47,000 at a composite interest rate of 4.6% per annum, to be repaid over a period of ten years in quarterly amounts of $1,175. This means repayment at the rate of 10% per annum. For the first period the effective rate payable for the use of this money is therefore 14.6% per annum, and while the interest component reduces pari passu with reduction of the principal of the debt, the 10% per annum on its original amount continues until the end of the 10-year period. Now, regulated utilities are not permitted to earn any such rates per annum on their invested capital, so that every year for the next ten years some of the cash required for these quarterly payments will have to come out of the earnings which otherwise might be available for payment of dividends to the common stockholders. It would be difficult to think of a transaction more effectively calculated to impair a company's credit in the securities market than this one.

Another example is Union Gas System of Kansas. In 1945 this little company placed at private sale $1,500,000 of 1st 3.50% 1965 bonds with 3% per annum sinking fund, and in 1948 placed $400,000 debenture 4.50% 1959, with 10% per annum sinking fund. The aggregate sinking fund requirements were thus $115,000 a year. In 1949, after interest and preferred dividends, the balance of net income for the common stock was reported at $145,000 as against $255,446 in 1948, and company in 1949 made additional cash advances to a subsidiary. In December of that year, an agreement with bondholders was negotiated under which they waived one semi-annual sinking fund payment each year for five years, beginning in 1950, and at the same time the same bondholders agreed to purchase $475,000 additional first 3.50% but with no sinking fund. All bondholders, however, may not be equally accommodating.

Therefore no company should contract a bond loan which requires heavy sinking fund or serial repayments. If that means that the company cannot obtain so large an amount of debt capital, very well. Let the company sell preferred stock or additional common. No preferred stock in these days needs a sinking fund feature in order to sell it, and common stock can always be sold if available earnings are adequate.

Preferred stock has been the subject of controversy for years, and from the viewpoint of the issuing company there seem to be few arguments in its favor. Debt capital usually costs the company a rate per annum well below the overall earnings rate realized on its total invested capital, resulting in a profit to the stockholders. Unless a preferred stock issue can be sold on such terms that it will effect some such saving, there is no earnings advantage in it to the owners of the company. During the year to date we have noted several sales of 5.50 preferred by companies whose overall earnings rate had been 6% or less for several years; there appears to be nothing in such a transaction to compensate the common stockholders for the risk they assume. But there are occasions when a preferred issue can be sold and additional common cannot be on reasonable terms, or where the common stock outstanding is to be largely increased at the same time. And of course the sale of non-voting

(*please turn to page 66*)



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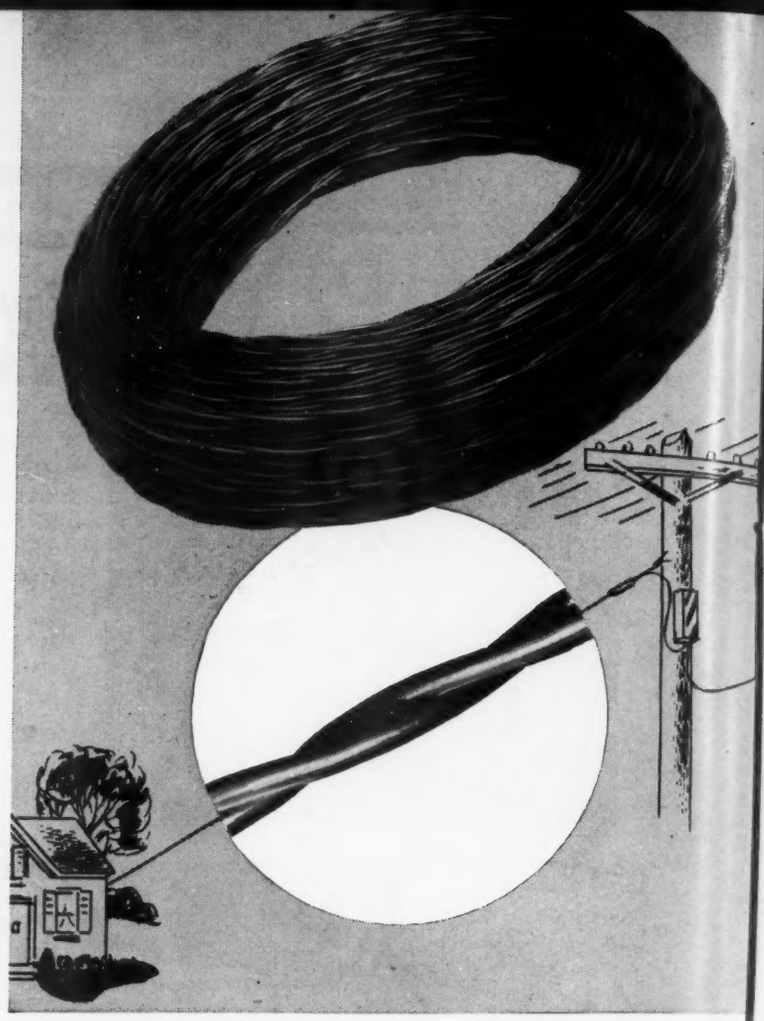

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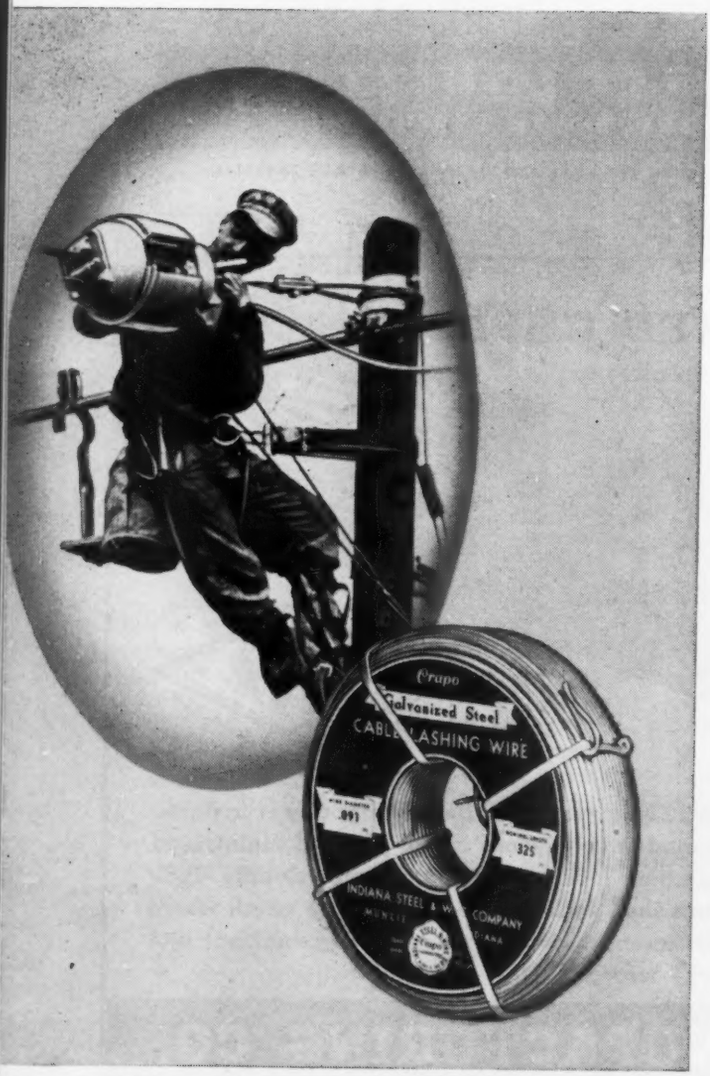

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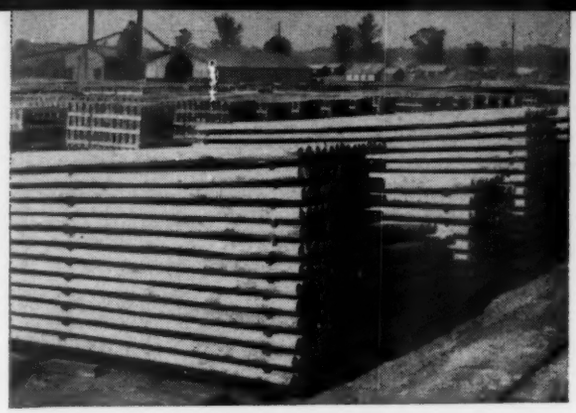

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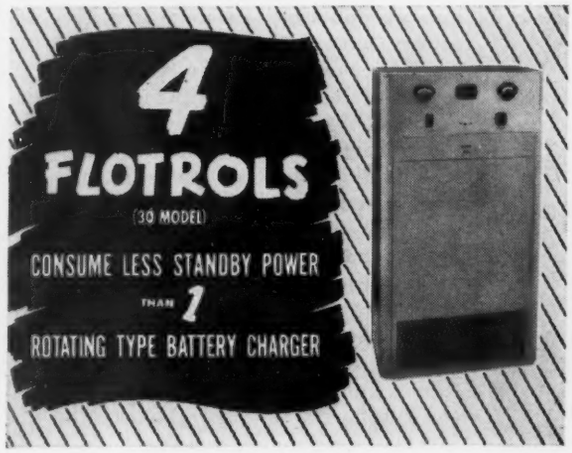

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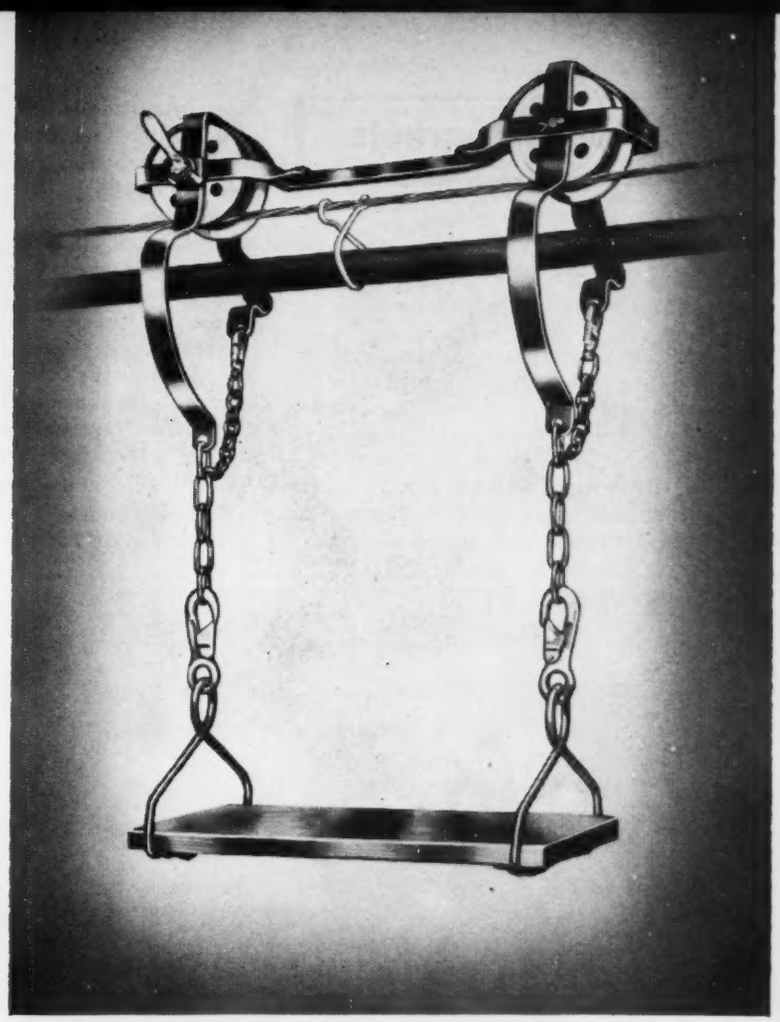

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THE KELLOGG SWITCHBOARD AND SUPPLY COMPANY

Money Markets

(*Continued from page 62*)

preferred is often convenient for controlling interests in common stock who are not prepared to increase their holdings proportionately.

Common stock is the class of security which perhaps always ought to be sold when it can be, even if at times it comes to constitute an unduly large proportion of the capital structure. If it is to be offered to existing stockholders, too large an issue should not be made at one time, in most cases not more than one new share to each six held. But such restrictions do not apply when a new issue is to be placed through underwriters, in whole or in part. Usually the best locale for the offering is the territory in which the company operates, but in some cases this is impracticable, especially where the new issue is a relatively large one. Readers of these columns must have noted that some common stock offerings by telephone utilities have been largely over-subscribed, while other offerings have been less than half-taken. The reason is almost always the dividend rate, earnings per share, and prospective earnings. Unless the company has been paying dividends commensurate with those being paid by other similar or competing companies, and unless such dividends have been covered by available earnings in ratios commensurate with those reported by other such companies, the sale of new common stock may prove difficult.

Bonds and Debentures

HISTORICALLY the dog-days are dog-days in the new securities markets, offerings of new securities of any kind being smaller in dollar value per month than in other months of the year, and slower to move into the hands of investors. But this year the record of the three months June-August did not follow quite that pattern. Total offerings and placings of utility bonds during that 1950 period aggregated $956 million as against $975 million in the same three months of 1949, but the 1949 period had included $385 million for the A.T.&T. convertible 3.125% debentures. Excluding this one big issue, the 1950 period showed a substantial increase over the year before.

The total of utility bonds actually placed in June alone was $652 million, well above the $554 million reported in our June number (page 32) as in registration for June. Utility bond placings in July and August, also, were each in substantially larger amounts than in the same months of 1949.

This year some of the bond offerings moved into the hands of investors slowly, partly because bond prices generally in the first two months of the period were on the decline, in fact had been in a declining trend for several months previously. This was not due to any influence exerted by the Korean incident (June 25), which had practically no effect on bond prices except on debentures convertible into common stock. For example, Consolidated Edison of New York convertible 3% 1963 declined from 135 on June 22, to a low of 110, but then recovered to 117 at the end of August. American Telephone convertible 3.125% 1959 fell from 129 on June 22 to 116, but have since recovered to 121. A special situation existed in the last-named issue. Some $53 million market value, or more than one-third of the amount then outstanding, was held by a speculative group on a 10% margin; the group had borrowed $48 million from banks to finance their opera-

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PHONE 4-2621

tions. These debentures were intended to be converted into stock. When the stock market went into a decline the bank loans were called, resulting in heavy sales of the debentures, but removing some 400,000 shares of the stock from its position of over-hanging the market. The stock dipped from 158 to 150, a loss not so great as that suffered by numerous others of comparable grade, but by the end of August had recovered to 153.

But then there came in again the old factor of over-pricing. This writer in June pointed out that for several preceding months any offering of utility bonds at a yield lower than 2.70%, no matter how high the rating, could not be sold on those terms. But in June, Dallas Power & Light offered $24.5 million of 30-year 2.75% at 2.685% yield; the syndicate closed with only 20% of the issue sold at that price. It took weeks to clean up. Late in August, Duquesne Light offered $12 million 2.75% on a 2.63% basis; the account closed August 31 with less than $2,000,000 of the issue sold, and the price fell to 101.875 bid, or below the 102.034 the underwriters paid for the bonds.

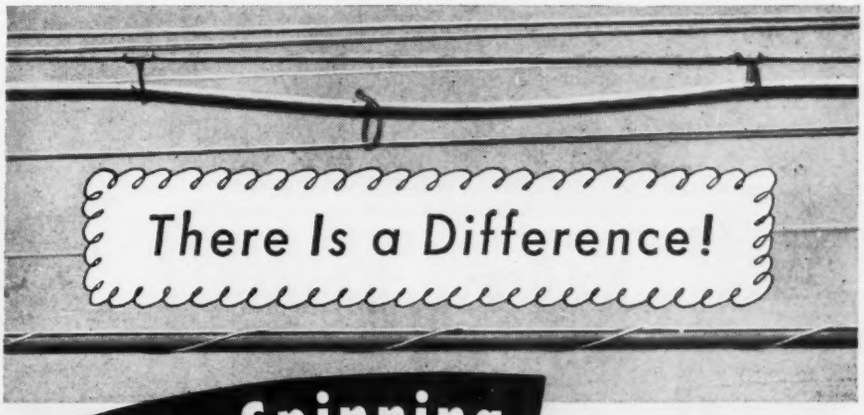
Telephone companies offered or placed during June-August 1950 a larger number of debt issues than in the preceeding three months, and in much larger dollar amount. This is shown in Table One. Prices and yields showed some trend toward lower money costs than the same companies, or similar companies, had previously paid, despite the lack of support or encouragement from the trading markets. The $60 million Northwestern Bell 2.75% 1984, sold quickly on public offering in June to yield 2.70%, replaced a like amount of 3.25% 1979 which had been sold in November, 1948 to yield 3.18%. Among the private placings were: Bell Telephone of Canada $8 million of ten-year 2.50% to yield 2.30%, to replace $7.5 million of 1st 5% due 1960, redeemed at 105; Interstate Telephone $750,000 of first 3.25% 1974 to yield 3.05%, last previous issue was 3.25% 1979 sold in June last year to yield 3.25%; Indiana Associated Telephone sold $400,000 of 3% 1975 to yield 3.00%, last previous transaction was 3.375% 1979 sold in March 1949 on a 3.375% basis.

Preferred Stocks

NOT MANY new offerings of preferred stocks were made for telephone companies during the June-August period. Bankers and prospective issuers have been afraid to undertake sales of this type of security, partly because prices of many issues that had been placed during the preceding three months yielded heavily along with prices of common stocks. But the few telephone companies which did make such offerings in June-August paid no more for their money than similar companies paid earlier this year.

One restraint on underwriting and offering of utility preferred stock was created by the action of one holding company. On June 19 several syndicates entered bids for blocks aggregating $33 million of preferred stocks of Arkansas Power & Light, Louisiana Power & Light and Mississippi Power & Light; the high bids named dividend rates of $4.95, $4.65 and $4.80 respectively. The parent company rejected all bids, and has not since been tendered anything better. But the experience was not encouraging to underwriters of preferred stocks. Preparation of a competitive bid for securities of any kind costs time and study and money; it oc-

(Please turn to page 68)



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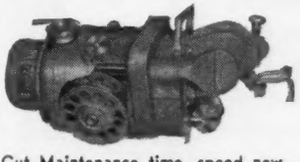
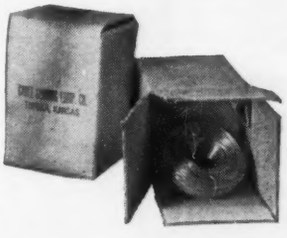
That's why more and more telephone companies everywhere are specifying spun cable for new construction and line maintenance.



Cut Maintenance time, speed new lines—equip your crews with Neale Model D Cable Spinner.



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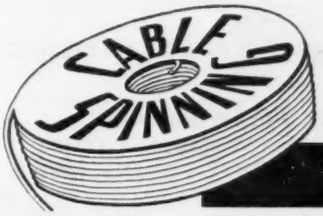

EQUIPMENT CO.
TOPEKA, KANSAS Phone 3-1829

cupies for a period the productive capacity of an expensive organization which it has taken years to build up. Small wonder that after such an experience an underwriting organization crosses preferred stocks off its list for a time, will not bid on a new issue.

Another influence was the reversal of price trend in the market for preferred stocks generally. Up to the end of May the trend for several months was rising, nearly all utility preferreds were selling in the trading markets at a premium over their offering prices. But in early June this trend was reversed, and for the last three months prices have been weak. For example, Rockland Light & Power 50,000 shares of 4.65% preferred offered in early June at 103.25, were advertised August 25 by a member of the syndicate at 100.

Total offerings of new preferred and common stocks by public utilities in the June-August period were in each month below the amounts for the same 1949 months, the total for the 1950 period was $147 million, against $170 million in the 1949 period. The Korea incident (June 25) had practically no effect on the bond markets, but it did have important reactions in the markets for common stocks, both new issues and those already outstanding. In the markets for new issues the principal result was the postponement of a number of offerings which had been set for July and August; among these were the Rochester Telephone, 125,000 shares; Consumers Power, 499,903 shares; Southern Company, 1,000,000 shares; and General Public Utilities, 1,300,000 shares. The reason given in each case was the unsettled conditions in the markets for common stock. Beginning June 26 these were so disturbing for some weeks as to make it almost impossible to determine a correct offering price for a new common stock issue. Nevertheless in July General Telephone Corporation successfully placed, mostly with its own stockholders, 199,350 shares of common at 25, the market price at the time; although just a few weeks previously the stock had been selling around 30. It has since firmed up to 27. Other issues of new common stock by telephone companies were in rather small amounts. Dividend yields showed little change from those on similar offerings made during the preceding period.

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"WHERE TO BUY THEM" DEALER
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Yes, you are better known as the telephone company in your community. But do you realize how many people depend upon your directory as a buyers' and city guide?
That's why the more-than-100 Loomis clients in cities from 10,000 to 100,000 leave it to Loomis. These Directory Specialists have a sound background in making your directory a more useful tool . . . a goodwill builder . . . a revenue producer. This gives you full time to run your telephone business. For a better directory, a more profitable directory
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Coming Conventions

Tennessee Independent Telephone Association, New Southern Hotel, Jackson, Sept. 27.

United States Independent Telephone Association, Hotel Stevens, Chicago, Oct. 9, 10, 11.

North Carolina Independent Telephone Association, Carolina Inn, Pinehurst, Oct. 16-17.

South Dakota Telephone Association, Cataract Hotel, Sioux Falls, Oct. 26-27.

Virginia Independent Telephone Association, Natural Bridge Hotel, Natural Bridge, Va., Nov. 2-3.

South Carolina Independent Telephone Association, Wade Hampton Hotel, Columbia, Nov. 6-7.

Georgia Telephone Association, Dempsey Hotel, Macon, Nov. 9 and 10.

Florida Telephone Association, Sheraton Plaza Hotel, Daytona Beach, Nov. 13-14.

Alabama Telephone Association, Jefferson Davis Hotel, Montgomery, Nov. 16-17.

Missouri Telephone Association, Muehlebach Hotel, Kansas City, Nov. 20-21.

Accurate adjustment of the mechanical parts of the selector guarantees many years of trouble free operation. A delicate touch combined with manipulative skill is required by the adjuster, who is here shown measuring the tension of the rotary interrupter springs.

From First Principles to Finished Product

In 1889 Almon B. Strowger made the first mechanism for the automatic selection of a telephone subscriber's line. The principle of selection he adopted was so logical, straight-forward and sound that it has remained unchanged through the intervening years to the present day as the basis upon which more than two-thirds of the world's automatic telephones operate. The type 32A (B.P.O. type 2,000) selector is the basic component of Strowger automatic telephone equipment as manufactured by Automatic Telephone & Electric Co. Ltd. Every week some two thousand of these selectors leave Strowger Works assembly lines and are despatched for service in all parts of the world.

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A.1291-B.104

Wintertime Maintenance

(*Continued from page 32*)

In addition, old style single-groove glass insulators may have been superseded by two-groove (exchange) insulators, but the former are satisfactory on farm lines if they are still in good shape.

For the most part, inspection of open-wire leads can be made from the ground or from the car, but in a few locations it may be advisable to climb the pole for a closer inspection. Such locations are the following:

(1) Junctions of open wire with cable
(2) Spur branchoffs from main lines
(3) Corners in the line using buck-arm construction
(4) Test points
(5) Railroad or river crossings
(6) Any other point where the construction or appearance of plant does not appear normal.

Foreign attachments, dead lines and items of plant not in use should be reported for future investigation and removal if required. Foreign attachments are sometimes placed on telephone poles without the proper authorization and payment of rental. Idle items of plant should be removed if they will not be reused in the near future, since they are better utilized elsewhere in actual service.

Wire Clearances At Road And Wire Crossings

GROUND CLEARANCES and separations from power wires and other circuits should be checked if they appear to be inadequate. The inspector should be familiar with the minimum clearance requirements for different situations of wire and road crossings.

Clearances of the wires from the ground at road crossings may be determined by measuring with jointed rods whenever the clearance appears questionable. Separations between telephone and power wires should not be measured directly on account of the hazard of possible contact with the power wires, but rather should be estimated.

If the clearance is found to be insufficient, it can be increased by shifting the telephone pole attachments to a higher or lower position as needed, by reducing spacing between crossarms or brackets, replacing the pole with a shorter or longer

(*Please turn to page 73*)

_____ 19_____

To the Alpha Telephone Company:

The undersigned being owner of real estate in the County of _____ in the State of _____, and of certain trees growing thereon, which have grown to interfere with the wires of the Alpha Telephone Company, which interference will increase if the said trees are not trimmed, permission is hereby granted to the Alpha Telephone Company to trim the said trees and keep the same trimmed so that the branches shall be clear of the wires at least eighteen inches, provided the same shall be done without expense to me. The property is described as follows:

_____

_____

Fig. 2—Typical form used for securing written permission to trim trees from a property owner.

STROMB

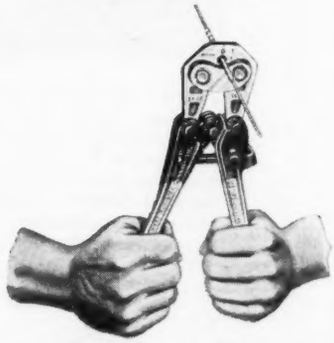
make line splices faster with nicopress splicing sleeves . . .

For line splices that *can't* pull out, made in half the time, specify *Nicopress* Splicing Sleeves!

Nothing could be simpler than making a splice in a jiffy with *Nicopress* equipment. Here's all you do:

1. Clean the wire end

2. Insert wire in sleeve



3. Compress sleeve with *Nicopress* tool

The result is a splice that will hold up for the life of the wire. Specify *Nicopress*—the finest in Splicing Sleeves!

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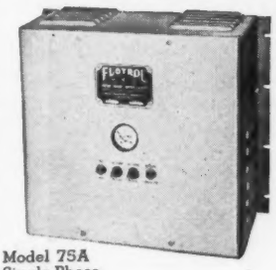
flotrol battery charger

the dependable partner of the famous Sub-Cycle



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Single Phase
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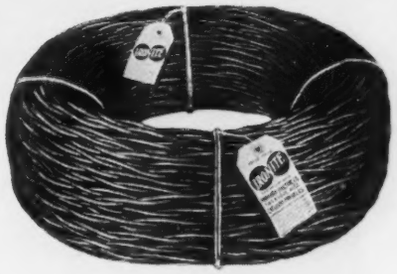
This single circuit protector, equipped with fuses and lightning arresters, is unexcelled for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
2. Tru-Gap high-potential dischargers that will not ground the line.
3. Phosphor bronze fuse and arrester springs, zinc hood, Everdur studs and washers. Hood is grounded when in place.
4. Choice of types and lengths of Cook Telephone Fuses.



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A new extra-flexible rubber insulation—holds tight to conductor.

A new weatherproof braid of long staple cotton and mineral fiber, saturated with stearine pitch and mica dust. U.R.C. specifications.

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Packed in approx. 1000 ft. coils in heavy carton.

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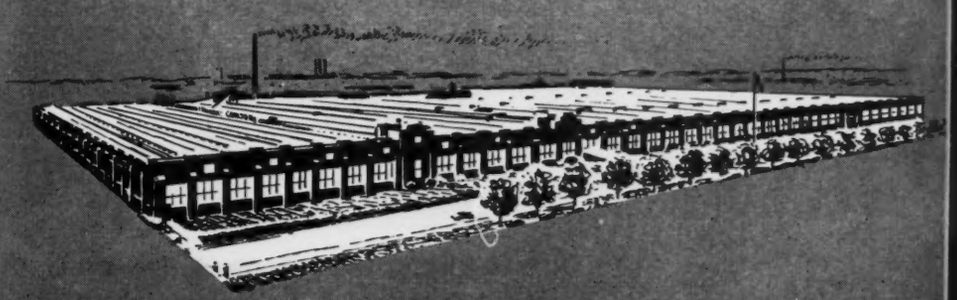

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pole, or placing an intermediate pole. If none of these methods will provide adequate clearance from power wires, the matter should be brought to the attention of the power company concerned so that it will arrange to relocate the power wires, attachments, or poles as required to effect the proper separation from the telephone wires.

It may seem that a couple of feet of separation between telephone and power wires would be all that is necessary for safety and this would be true under normal circumstances. If lightning, however, strikes the power line and jumps off to the crossing telephone wires, the current from the power line will follow the path of the lightning stroke and a sustained arc will result with severe damage to the telephone plant and protectors. Lightning may jump a four-foot or six-foot gap between a power wire and a telephone wire, but at the maximum power line voltages permitted for these separations, no sustained power arc will be produced. It is wisdom to insist on and obtain at least the minimum required clearances and thus assure the safety of the public and telephone company employees and the protection of telephone plant from damage.

It often happens that although there is proper clearance between telephone and power wires, power guys and stubs are located too close to telephone conductors and poles (Figure 1). Such points of possible conflict should be looked for and corrected whenever found.

Interference from trees and shrubs should be noted. If it is evident that trees should be trimmed or shrubs cut back or removed, the inspector should obtain written consent from the owner of the property abutting the right of way. A commonly used form for obtaining written permission is illustrated in Figure 2. Dead or weak branches should be noted for removal if it is apparent that they are about to fall on the telephone lines.

Where tangled growths tend to occur and considerable work would be required to eradicate them, consideration should be given to killing the woody growths with chemicals. Such locations should be indicated on the inspector's report for future action.

Checking The Condition Of Poles

TREATED POLES that have been in service less than 10 to 15 years are generally considered sound. After this period, a few of the poles may become weak enough to fail

If you've ever been up on a 50-foot stick when your life depends on the quality of the belt and safety strap you use, you will appreciate the high quality and care that is so much a part of all Klein equipment. When life's at stake, there can be no compromise with quality. Old timers know that Klein equipment has stood for quality in linemen's tools and equipment—"since 1857."

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under storm stresses. When this point is reached, the poles should be inspected one by one and those showing signs of having started to deteriorate should be tested. In the case of a light rural lead (consisting of 10 wires or less), a pike pole test is made. In this test, a pike pole is placed against the pole in the center of the wire load and a steady push with the pike at approximately 45 degrees angle is applied. One man on the pike for a lead of 6 wires or less, or two men for a lead of 6 to 10 wires provide sufficient force to adequately test the pole in this manner. If the pole does not break or crack, it is considered strong enough to last for 4 or 5 years more, corresponding to second or third inspection period.

Poles along highways may have been damaged by motor vehicles colliding with them, particularly those set close to the road or at road jogs. The inspector should test poles showing signs of having been damaged in this manner to make sure that they have not been broken below the ground line by the impact.

Guyed poles or poles carrying more than ten wires cannot be properly tested by the pike pole method.

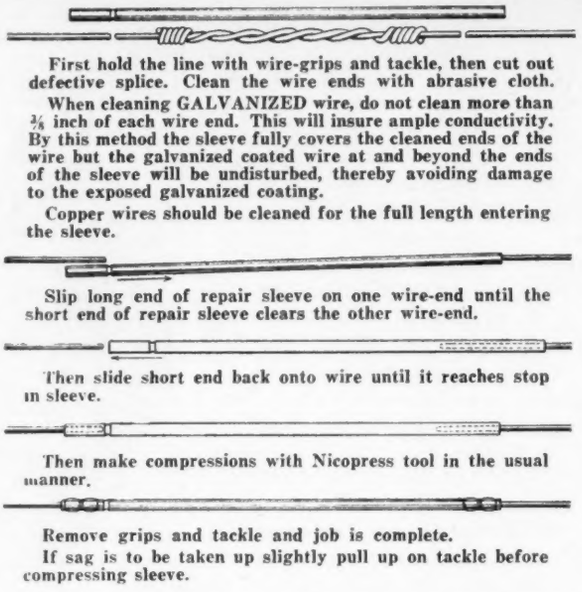

First hold the line with wire-grips and tackle, then cut out defective splice. Clean the wire ends with abrasive cloth.
When cleaning GALVANIZED wire, do not clean more than ¾ inch of each wire end. This will insure ample conductivity. By this method the sleeve fully covers the cleaned ends of the wire but the galvanized coated wire at and beyond the ends of the sleeve will be undisturbed, thereby avoiding damage to the exposed galvanized coating.
Copper wires should be cleaned for the full length entering the sleeve.
Slip long end of repair sleeve on one wire-end until the short end of repair sleeve clears the other wire-end.
Then slide short end back onto wire until it reaches stop in sleeve.
Then make compressions with Nicopress tool in the usual manner.
Remove grips and tackle and job is complete.
If sag is to be taken up slightly pull up on tackle before compressing sleeve.

Fig. 12—Use of repair type sleeves to replace old handmade splices. (Data courtesy of the National Telephone Supply Company.)

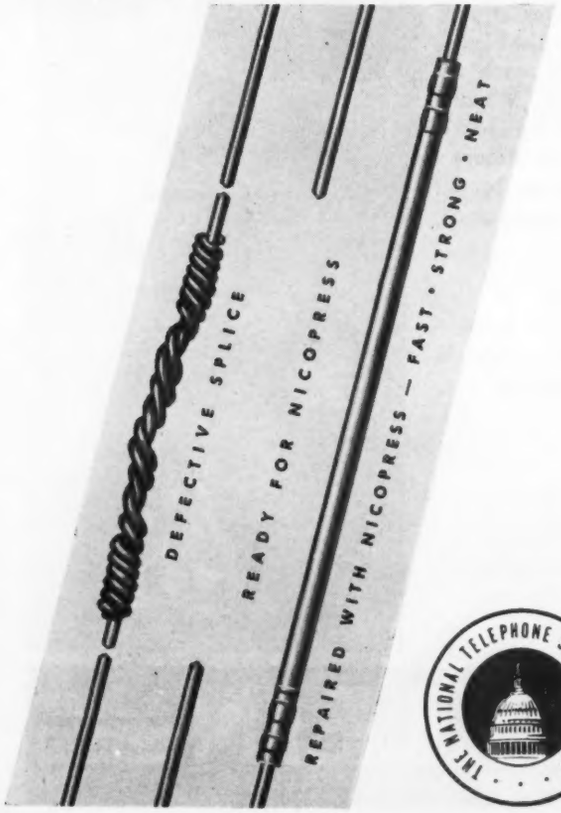
Such poles should be inspected and replaced if (1) they are too short to provide proper ground clearances for the line wires; (2) they are weakened to a dangerous extent by lightning or storm damage, by woodpeckers to the extent of removing more than one-forth the cross section of the pole, or by a split or broken top; (3) they have the sapwood decayed to the extent that one-half or more of the exterior is extremely rough (*Figure* 3); they have a hollow heart resulting in a shell of solid wood less than 2½ inches thick all around; and (5) they have decay pockets.

Hollow heart and decay pockets

Eliminate defective splices

with

***Nicopress* REPAIR SLEEVES**



Use Nicopress repair sleeves to eliminate high-resistance joints caused by makeshift splices. Simply cut out the defective splice, insert exposed ends into the special-length Nicopress repair sleeve and compress with Nicopress tool. **That quick,** you have a neat, dependable splice, stronger than the original wire! Ask your Automatic Electric representative about Nicopress repair sleeves as well as Nicopress sleeves for other uses.

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can be detected by sounding the pole with a hammer. In this case, care should be taken not to confuse the sound produced by these defects with those caused by shakes or large checks in the pole, or by a wet pole surface or interior (the latter resulting from absorption of excessive soil moisture). When a hollow heart condition is indicated, the pole is taken out of the ground for a closer examination to determine the extent of this condition. If the pole butt is found to be honeycombed by ants or termites throughout the cross section, the pole should not be reused.

Replacing Defective Poles

WHEN A NEW pole is to be set in place of an old pole, the latter should be cut off at the base and then set to one side. The butt is removed by means of a pole derrick or a pole jack, or by prying with digging bars. The old pole is cleaned out to remove loose soil and wood slivers. The new pole is then set in the hole and the hole is backfilled, followed by a thorough tamping of the earth.

The old pole is lashed to the new pole and the attachments are transferred from the old to the new pole, after which the old pole is untied and lowered to the ground to be taken away and disposed of.

Stubbing Poles

THE STUBBING of poles is not recommended as a regular practice, but this method may be justified under certain circumstances. For example, the ground clearance of line wires crossing over a road may be found inadequate, and it is not practicable to shift the pole attachments to a higher location to increase the clearance. In this case, rather than replacing good poles with taller and more expensive ones, the crossing poles may be raised and then stubbed to strengthen them and to compensate for the decreased depth of the poles in the ground. In other situations, a replacement pole of the proper class may not be immediately available and it is not advisable to delay the replacement of the pole. Stubbing may then be resorted to. It should be noted in this connection that stubbing will not increase the strength of the pole that is too small for the wire load. Stubbing works well only in the case where the pole butt has been reduced in circumference at the ground line as the result of decay or other causes while the rest of the pole is of satisfactory strength.

To assure adequate pole strength,

(*Please turn to page* 78)

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Galvanized wire for long life, high strength, low resistance, in ½ mile coils, approximate weight 85 lbs.

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Less than 1500 lbs. $11.58 per 100 lb.
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Construction cable splicer is shown in the process of making a test splice.

and contracts during the cool of the evening and night. This continual push and pull creates cable sheath strain and eventually tiny cracks develop. Rapid changes in the temperature cause the cable to breath—drawing moisture and water into the cable. The wires inside the cable are wrapped in paper insulation and when cable sheath cracks develop the paper absorbs moisture. The tiny leakage of electricity through this moisture can be picked up by the electronic test set.

By detecting these small cracks and correcting them before the rain does its damage, we protect and make our customers' service more dependable.

Rapid Inspection and Repair

UNDER this method, dry nitrogen gas with the special Bell Lab soap solution is used to detect infinitesimal cracks and holes in the cable sheath for correction before the customers' service is affected.

EXCHANGE CABLE MAINTENANCE

(Continued from page 29)

This Rapid Cable Inspection should be made during the periods when the effect of contraction and expansion of the cable sheath is most severe.

The cable on which the most trouble is encountered, based on the cable history record, is tested and checked first.

In testing by the Rapid Cable Inspection method, dry nitrogen gas is forced into the cable through a small hole made with a special boring tool. A valve, similar to the one on the innertube of your automobile tire, with a rubber collar, is fastened around the cable, directly over the hole and made air-tight by an adjustable chain strap. The gas is in a metal cylinder under approximately 2200 pounds pressure per square inch and is connected through a small rubber hose, exactly like putting air in the tires of your car. The gas pressure placed in the cable is limited to ten pounds by a control valve.

Two men are used on this rapid coverage operation. As soon as the gas has been properly connected, the men start walking along the cable route in opposite directions. After walking approximately 1000 feet each man climbs a pole and bores a hole in the cable, as in the first operation, to be certain the gas has reached this point—it's usually there. The hole, when no longer needed, is plugged with a machine screw and sealed with lead solder, using a Prest-O-Lite torch.

The cable is carefully inspected at every pole and as far on each side as a man can reach. With climbers, when not on a stepped pole, a man can "squirrel around" and inspect as much as five or six feet on each side of the pole.

The special soap solution is carried in an aluminum one-half gallon bucket, the top of which is concave. The brush has a heavy rubber collar and fits snugly to prevent spilling of the "suds". The soap solution is applied to the cable with the brush.

The entire sheath area that can be reached from the pole is thoroughly soaped and inspected for the tell-tale "Sherlock Holmes" bubbles. If no bubbles appear, all visible defects are carefully checked and when a severe defect is found the cable is flexed to see if a crack will come through. Sleeves in the span are soaped and checked from a ladder.

Repairing Defects

DEFECTS ARE TAPED. The end of the tape, known as a flag, is left to hang down about five inches so the repair crew can quickly spot it. Some of the defects require opening the cable sheath and drying out the insulation with Desiccant Powder. Cables were formerly dried out with hot paraffin at a temperature of between 375 and 390 degrees. Thanks to the Bell Labs a much simpler drying process using Desiccant Powder was developed to replace the paraffin method.

There are two ways to open cable. One is to slit the cable, known as the "zipper method." The sheath is split, repairs made, and the slit sheath soldered. The other method is used where a large number of pairs are affected. The sheath is removed, repairs made and the opening is closed with a sleeve which is wiped on with molten lead. It requires great skill to pour molten lead and wipe an effective joint with wiping cloths. To

NITROGEN GAS TEST AND SLIT-SHEATH REPAIR (CONT'D.)

The damaged insulation on the wires is now repaired with Scotch tape to restore insulation.

8 ***The wires are next wrapped with Empire tape to securely bind and insulate them from the sheath.***

9 ***The lead is closed around the wire with cable pliers.***

10 ***The lead sheath is now cleaned for soldering.***

check the soundness of the wiped joint, soldered seam and the lead sheath on both sides of the sleeve, a "flash" test is made, using dry nitrogen gas and a soap solution.

Every defect found that is not corrected, including cable rubbing limbs, missing pole steps, etc., is written up on a special form and given to the foreman for immediate correction. Another crew then corrects these defects in order to enable the two-man testing crew to more rapidly cover the cable plant. A daily summary is made of the cable covered and the results obtained.

A Tribute To Cable Repairmen

ALL CABLE MEN must always be service minded for they know a damaged cable usually means many telephones out of service—at times a thousand or more—telephones which may serve such important customers as hopitals, doctors, government agencies, etc. Uninterrupted telephone service is of extreme importance, especially during periods of emergency.

Most men work with their feet "on the ground", but the Cable Man's feet may be ten feet under, down in a deep muddy ditch in the rain, or dangling from a small seat thirty feet up.

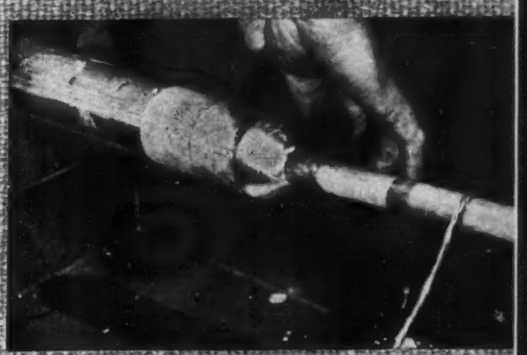
When Mother Nature acts up with storms, lightning, wind and rain, when the temperature drops to bitter cold, that is when cable trouble most often develops. And that is when you will find Cable Men, along with other Repairmen and Construction People when needed, out repairing the damage and promptly restoring service.

Under such conditions the "Spirit of Service", which is traditional with all telephone people, manifests itself in the highest, and the employees who perform work under adverse conditions are saluted.—(*Reprinted from Southern Telephone News.*)

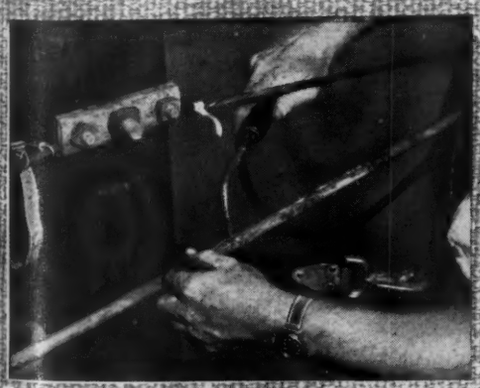
A *Dirt or dross is skimmed off with the solder ladle after the right temperature of the solder has been determined.*

B *Catch cloth is held under the cable, and solder is then slowly poured over the sheath and cable.*

C *The solder in the catch cloth is then applied to the top of the joint to help distribute the heat uniformly around the joint.*

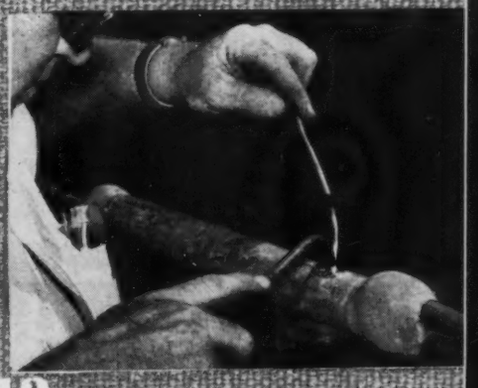


D *Finishing touches are added to the joint by using a small cloth as the solder begins to cool and the operation is completed.*



1 *Acetylene torch is being used in the above picture to solder the cable sheath.*

2 *The hole at the gas admission point where the pressure testing clamp was placed is filled with a machine screw plug.*



3 *To prevent moisture from entering the cable, solder is now placed over machine screw plug.*

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Winter Maintenance

(*Continued from page* 75)

a treated 10-foot stub of at least the same original ground line circumference of the pole should be used. Standard pole stubbing bands are better than wire (*Figure* 4) for fastening the pole to the stub. Some companies cut off and remove the pole butt when stubbing the pole, but it is considered more satisfactory to leave the butt intact. The hole dug for the stub should be of a depth standard for poles of the same height as the pole being stubbed. After the stub is set in the hole, the latter is backfilled and the earth tamped thoroughly in place. The stubbing bands are then attached. A typical stubbed pole installation is illustrated in *Figure* 5 and the method of attaching the bands is shown in *Figure* 6.

Crossarms on the poles should not be split or decayed to such an extent as to cause the insulator pins to be pulled out or to settle on the arm as indicated in *Figures* 7 *and* 8. A split crossarm that is otherwise sound may be repaired by passing a carriage bolt through the split end or by fastening a stainless steel band tightly around the end. A split crossarm end is often the cause of the insulator pin at the end pulling out and causing the wire to fall to the ground.

A decayed or damaged insulator pin will not satisfactorily hold the line insulator and must be replaced, otherwise a floating insulator will be the result as indicated in *Figure* 9. Broken or missing insulators should be replaced with new insulators of the proper type. The line wires should be properly tied to the insulators. If ties are broken or missing or sufficiently loose to cause the wires to come off the insulators, new ties should be made, using new tie wires. In replacing the ties, care should be taken not to damage the line wires.

Decayed or damaged brackets (*Figure* 10) require replacement with new brackets. Good brackets that are loose should be securely renailed. Sometimes relocating the bracket a little to one side of the original position will provide a more secure attachment of the bracket.

Excessive slack in line wires is an annoying cause of frequent

(*Please turn to page* 80)

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LOCUST PINS

Locust wood is practically impervious to decay and is impenetrable to moisture. Because of its close-grained hardness locust can be machined into strong, long lasting pins of standard specifications that can be counted on to retain their size and shape.

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Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

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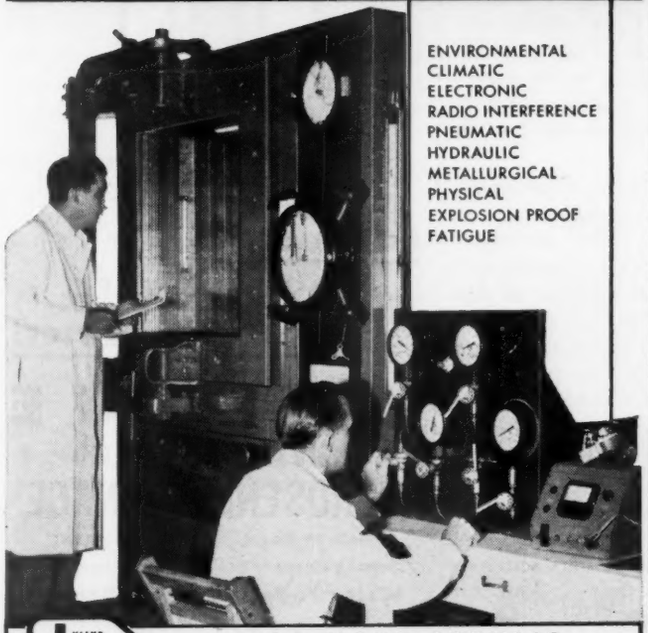

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line shorts, often of the swinging variety. Generally, slack wires are the result of one of the following conditions, namely, (1) insufficient tension at the time the wires were strung in cold weather, causing the wires to sag excessively with the coming of warm weather; (2) failure to prestretch the wires before slacking them off to the proper sag value at the time of installation; or (3) a leaning corner or dead end pole caused by slipping of the pole guy or its anchor.

Excessive slack which is due to a leaning pole can be corrected by straightening the pole. A pole pushing jack may be used for this purpose, or, if one is not available, sufficient earth may be removed from the guy side of the pole and the pole pulled over to the proper position by means of a chain or ratchet hoist on the guy. After retightening the guy clamp and reserving the tail of the guy, the scooped out earth should be replaced and well tamped in place.

Corner poles should not lean more than 3 feet at the top as the result of an unbalanced pull. In straightening the pole, it may be necessary to untie the line wires and splice in short pieces of wire to maintain the proper wire sag and prevent excessive pull on the insulator pins or brackets.

If the pole lean was caused by slipping of the anchor, a larger anchor should be placed. In a few instances, where the guy lead-to-height ratio is too small (less than ½), and it is possible to salvage the anchor, the anchor may be reinstalled at a greater distance from the pole, if practicable, to provide a lead-to-height ratio of 1 to reduce the strain on the anchor. It is desirable to rake the pole slightly in the direction of the guy, if possible, as this increases the strength of the line to some extent.

If trouble has been experienced previously with poles leaning in straight sections of the line, even after restraightening, ground bracing will provide a permanent solution of this difficulty. In light pole leads, it is usually sufficient to dig a trench on the side towards which the pole tends to lean and bury a creosoted log in the trench close up against the pole to keep the pole from leaning back again.

In general, poles should not lean more than 1 foot for every 10 feet of pole height in leads of six wires or less, or not more than 1 foot for every 15 feet of pole height in leads of more than six wires. Normal pole rakes of up to 1 foot for each 8 feet of pole height are permissible for the purpose of clearing obstructions.

If slack in the line wires is due to

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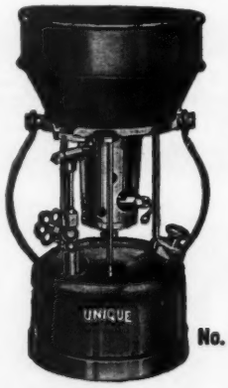

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stretching of the wires, the slack can be cut out and the wire ends respliced with compression or rolled sleeves. Particularly where only a small amount of wire is to be cut out, compression sleeves are preferable to double-tube twisted sleeves as they do not require piecing out the wires and making two splices in each wire as indicated in *Figure* 11.

In removing hand made splices, it will be convenient to use repair type compression sleeves as illustrated in *Figure* 12 and thus avoid the need for making two splices in one wire in order to maintain the proper wire sag. If there are a number of splices close together in a span, it is desirable to replace these sections with new or good used wire. This procedure will prevent trouble with other splices going bad after one splice is replaced. Such trouble is attributed to the releasing of tension on these splices when the wire is cut to make a new splice, causing them to loosen and become noisy. A good rule to follow is to replace sections of the span with splices closer than 25 feet to a proposed splice.

Line wires that are in good condition are generally smooth and grey to black in color, depending on the length of time they have been in service. If the wires are badly pitted or rusty, they should be replaced with new or good used wire. Kinks or nicks should be cut out and the wire ends spliced together.

Removing Debris On Open Wires

IT IS A COMMON occurrence for open wires to accumulate debris as the result of weeds or broken branches being blown onto them. Pieces of wire or other objects are often thrown onto the wires by passersby. In such cases, it may be possible to shake the foreign object off the line wires, untying the wires if necessary for more vigorous action. Sometimes vibrating the wire by holding it with one hand and striking it sharply with the other hand will cause the hanging object to jump off. Pliers or other metallic tools should not, however, be used to strike the wire as this will almost certainly produce nicks in the wire and weaken it.

If the object will not come off, a handline should be thrown over the wire and used to pick up the object and move it over to a pole where it can be taken off the wire. A broken branch tangled in the wires may be cut to pieces with a tree trimmer, care being taken not to cut the wires

(*Please turn to page* 82)

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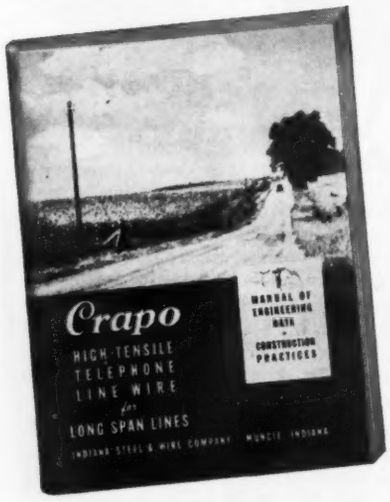

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in the process, and the pieces pulled off the wire with the trimmer.

In extreme cases, the wires will have to be untied or cut and then lowered to bring the object to the ground for removal and afterwards restored to their original positions. It is a good idea to take away wire scraps and other objects found in the vicinity to prevent a repetition of the trouble.

Bridle Wire And Drop Wire

BRIDLE WIRE is commonly used for jumpers at junction poles, buckarm corners, and spur connections to main lines. The insulation on bridle wire deteriorates with long service and may cause trouble due to line leakage. There is also a tendency on the part of some repairmen to fail to properly insulate splices made in bridle wire, especially when opening the line for tests, and leakage occurs in wet weather. All wire with deteriorated insulation should be replaced with new wire.

Bridle wire is prone to damage by lightning and, for this reason, it should be used only when line wires cannot be run directly to their junction with other line wires. A lightning discharge that apparently has no effect on steel line wire will vaporize the small gauge conductors of bridle wire.

Since drop wire has comparatively short life and is easily damaged, drop spans should be properly routed to avoid contact with trees and other obstructions. Where such contact cannot be avoided, they should be protected with wire guards. The spans should have sufficient sag to reduce strain on wire insulation at the span attachments, and at the same time they should have proper clearances from the ground and from foreign circuits.

Conclusion

THIS ARTICLE has covered only the salient points of outside plant maintenance stressing the proper inspection procedures. To do an effective job of preventive maintenance, the person handling the inspection should be capable of determining likely points of trouble without going too far in condemning plant items that may actually be good for a number of years of service. The most successful results have been obtained when a telephone exchange manager with long experience in plant construction and maintenance work personally conducts the inspection of outside plant and assigns the repair work to employees under his supervision to handle on a routine basis.

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Book Review

Electrical Communication (3rd Edition), by Arthur L. Albert; published by John Wiley & Sons, Inc., New York, N. Y.; 593 pages; price $3.50.

ELECTRICAL COMMUNICATION considers the specialized fields of the subject as they are related to one another in modern communication systems. It has been the author's aim to treat the entire industry instead of merely presenting isolated electrical theories of communication. Thus he provides a basic training upon which a successful career in communication engineering can readily be built.

In covering the entire field, such subjects as the following are thoroughly treated: acoustics . . . electroacoustic equipment . . . electric networks including impedance-transforming circuits and wave filters . . . telephone lines and cables . . . radio transmission lines and cables . . . telephone systems . . . telegraph systems . . . radio systems.

Among the features, revisions, expansions, and modernizations of the third edition are the following:

(1) Material on radio greatly extended to treat in detail both communication and broadcasting.

(2) Material on dial telephony expanded and emphasized.

(3) Review questions added at the chapter endings.

(4) Illustrations and problems revised and increased.

(5) The standards of AIEE and IRE followed closely.

(6) Extensive references included for those interested in additional information.

(7) Higher mathematics used as required (contains many numerical calculations) but book is arranged so that material can be followed even if the mathematics is skipped.

Arthur L. Albert received his B.S., M.S., and E.E. degrees in Electrical Engineering from Oregon State College. He began teaching there in 1923 and is now Professor of Communication Engineering. He has also taught at the Oklahoma Agricultural and Mechanical College and at Purdue University, where he was Professor of Electrical Engineering.

Professor Albert has practical experience as well, gained while working with the Pacific Tel. & Tel.

In addition to many technical articles in communication, Professor Albert has written a total of six college textbooks in electrical engineering, electronics, and communication.

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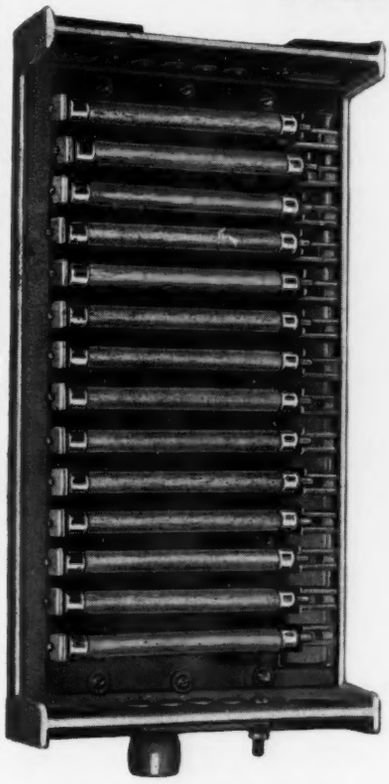

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Protected Cable Terminal

Type 40 Terminal 7 pair, less stub, with cover (not shown). Cat. No. SA-34

This compact 7-pair-capacity terminal offers complete versatility and protection. It is equipped with detachable mounting bracket (may be bolted to pole before terminal is placed) and the cover is reversible so that cable may be led in from top or bottom. Complete terminal with cover is 7¼" wide, 4¾" deep and 14" long. Has accurately gauged discharge blocks, and 3-ampere wood fuses.

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Washington Reports

(Continued from page 27)

profit in advance is considered to provide not only stronger incentive for good performance, but stronger support for wartime production, distribution and stabilization controls." In other words, close initial pricing will be the watchword of the board.

Communications Controls

TELEPHONE companies, Western Union and international carriers, together with railroads and electric and gas utilities, would not come under the authority of the new proposed wartime government price stabilization legislation, H.R. 9176, according to an agreement on the "utility rate" provision of the bill by the Senate-House conference committee. Only common carrier and utility charges for property and services sold for resale to the public—such as interstate power transmissions to REA cooperatives, natural gas direct to the consumer, etc.—come under the price regulatory powers to be given to the President.

The provision in Title IV, Section 402 (e) (v) of H.R. 9176 which was slated for final adoption by the conferees as this publication went to press now will be voted upon by the Senate and House in the conference report before the bill is transmitted to the President for signature.

The amendment read: "Provided: that no common carrier or other public utility shall at any time after the President shall have issued any stabilization regulations and orders under subsection (b) make any increase in its charges for property and services sold by it for resale to the public, for which application is filed after the issuance of such regulations and orders before the Federal, State or Municipal authority having jurisdiction to consider such an increase."

The conference committee by this action rejected the amendment, passed by the Senate of Senator Hill (D., Ala.) which would have reestablished the regulatory authority over telephone and communication rates largely similar to that possessed by the Office of Price Administration which had a utility-communications section. Of course, the reincarnation of the OPA idea would have had considerable influence on certain state commissions which respond to political "winds".

Labor trends

POINTING to a swiftly-tightening "buyers" market in the labor field, U. S. government figures show employment in August was the greatest in U. S. history with the tally on jobholders jumping to 62,237,000. The figure is 1,000,000 above that for July and 750,000 more than the record set in July, 1948. Secretary of Commerce Sawyer predicted, in the face of the figures, that employment "will continue at an accelerated pace" with August being too early to give full indications of increased industrial activity because of the Korean war and the international situation generally.

In efforts which will no doubt have an early effect on "civilian" industries, including the smaller Independent telephone companies, with regard to the labor market, the Defense Department has joined the Department of Labor in asking defense contractors to work with Federal and state employment services in hiring new workers. Munitions Board Chairman Hubert Howard has already asked military suppliers to make fullest use of the government placement agencies so as to avoid housing and manpower problems.

Ozark Central Announces $50,000 Improvement Plan

According to an announcement made by T. L. Leonard, president of the Ozark Telephone Co., Ozark Central will soon start construction of a $50,000.00 improvement to its system in Houston, Mo.

Mr. Leonard also stated that it was the intention of the company to take over and operate some of the rural lines in the area as soon as labor and materials will permit.

New Swbd. Installed At Plankington, S. D.

According to James W. Tobin, owner of the Citizens Telephone Co., Plankington, S. D., the "time-honored switchboard of the Citizens company has been gradually eased out of a job," and calls now go through the new board, recently installed by the company. The old board was made in 1903.

Total cost of the new telephone improvements is about $7,000. In addition to technical improvements, Manager Tobin has re-arranged and improved the building in which the equipment is located.

STROMB

long life telephone dry cells

"Eveready" "Columbia" "Gray Label"

• Higher sustained voltage • Longer life • Rock-bottom economy.

These qualities, more important now than ever before, are assured through the constant supervision of America's largest dry battery laboratory.

Made by the makers of "Eveready," "Air Cell" Operators' Transmitter Batteries.

The quality cell preferred by telephone engineers

STROMBERG-CA

STROMBERG Telephone CARLSON

TELEPHONES, SWITCHBOARDS • SOUN EQUIPMENT

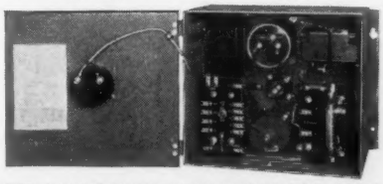
BERG-CARLSON recommends...

. . . bigger savings plus better service with raytheon rectifilters*!

For more than a decade, leading independent telephone companies have found that Raytheon Rectifilters are the most economical and efficient way to supply steady DC power to PBX boards directly from an AC source.

With no moving parts, the Raytheon Rectifilter requires neither adjustment nor maintenance. It will outlast many sets of batteries, release wires carrying charging current from central office to subscribers' PBX boards for revenue producing service, and minimize power cost because of high efficiency in converting from AC to DC.

Dry disc rectifying units and other components are designed for long-life, trouble-free service. The Raytheon Rectifilter will end your telephone power problems. Just plug it in, close the door —and forget it!



RFR 1044-G RECTIFILTER WITH DOOR OPEN

*Reg. U.S. Pat. Off.

a product of actual field study

The Reliable B27 Protected Cable Terminal has resulted from basically sound engineering, supported by actual field experience. It places all connections within convenient reach of the lineman without necessity of removing fuses or reaching around the terminal—also a decided advantage in inspecting.

Detachable mounting bracket permits one-man installation. Ground connection is made directly to ground strip, reducing possibility of high resistance ground. Reliable Self-cleaning Sawtooth Discharge Blocks are standard—insuring dissipation of static discharges without danger of unnecessarily grounding the line.

RELIABLE
B27 CABLE TERMINAL

for the safety of your linemen, specify buckingham equipment

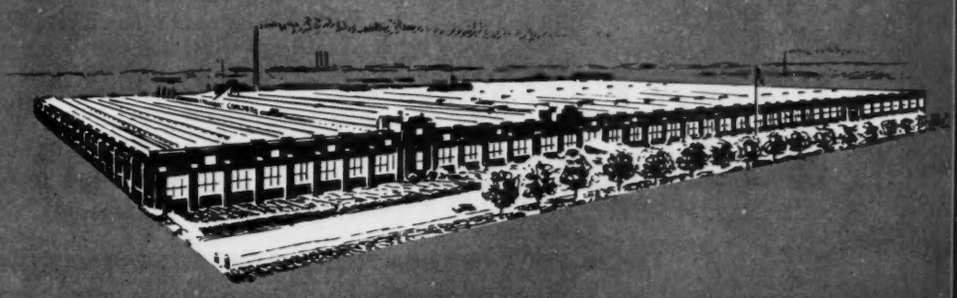
Dedicated to the proposition that a lineman on a pole is only efficient as long as he's safe!

Buckingham makes everything (and everything good!) that a lineman needs. Famous Stephens climbers, in all weights and sizes . . . tree climbers with 3½ in. gaff . . . safety seats, straps and pads . . . tool belts, bags, buckets and saw scabbards . . . "protecto grips" and thread cleaners.

Play safe! Buy through Stromberg-Carlson the products of Buckingham.

-CARLSON

Factory, General Offices: Rochester 3, N.Y.
Branch Offices: Atlanta 3, Chicago 6, Kansas City 8, San Francisco 3. In Canada: Stromberg-Carlson Co. Ltd., Toronto



UIPMENT AND ELECTRONIC CARILLONS • INDUSTRIAL, INTERCOMMUNICATION SYSTEMS • RADIOS, RADIO-PHONOGRAPHS, FM AND TELEVISION

A Full 5 Inches of Body Movement
With Ease and Safety

BASHLIN'S
New Shifting Tool Dee Safety Belt

Next to Safety in the experienced lineman's book, Accessibility of Tools is of first importance in selecting a Safety Belt. This new Bashlin Safety Belt is designed with sliding tool loops . . . keeps tools within easy reach. And the built-in extra safety factor saves the Safety Strap from wear. It's Safe . . . Practical . . . Comfortable . . . and you *know* it's right. It's Bashlin.

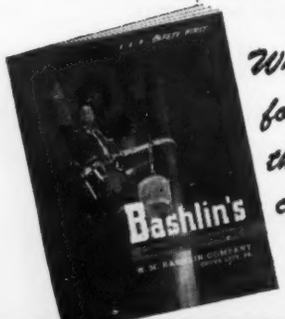
Another First

One piece aluminum sleeve adjusts from 15" to 18" in multiples of ¼". Locked in place with standard steel screws.

Comfort on the job, lightness and safety combine in Bashlin's adjustable Climber with removable gaff . . . Forged of aluminum alloy, the Bashlin Climber is lighter than conventional climbers and the *Same Strength as Equivalent Steel.* It's form fitting and has all the original Bashlin features.

No. BD 14

Removable gaff forged from alloy steel, features triple locking device with standard self-locking tested steel screws



Write for this catalog

W.M. BASHLIN COMPANY
GROVE CITY 1, PA.

Associated Tel. Co., Ltd. Affiliated Unit Activated

Alerted for active duty, Reserve members of the 314th Signal Heavy Construction Batallion, sponsored by Associated Telephone Company, Ltd., Santa Monica, Calif., received orders during August to report for an unknown destination on September 11, 1950.

The 16 Associated Company members in the Unit include the Commanding Officer, Major Oliver L. Akins, Jr., of the General Commercial Department, Executive Officer, Capt. Irwin C. Vander Heide, of the General Engineering Department, Capt. Paul F. Sercu, 1st Lt. Leo A. Birch, 1st Lt. John G. Gibbons, 1st Lt. Reino J. Rantman, 1st Lt. John J. Higgins, 2nd Lt. Stephen I. McCaron, Sgt. Joseph R. Antal and Sgt. Rudolph R. Black of Santa Monica; Capt. William D. Anderson and Cpl. Victor Santoro of Long Beach; Capt. George Janesick of Laguna Beach; 1st Lt. James B. Black and 1st Lt. Albert Bates of Whittier, and 1st Lt. William J. A. Thomas of Downey. The remaining members of the Unit are not employed by Associated Telephone Company, Ltd.

The Battalion, organized in October 1948, was one of the first two Signal Corps affiliated units to be formed by telephone companies in the West. The other Unit, a Signal Depot Company, was also sponsored by Associated Telephone Company, Ltd.

Affiliated units may well be a vital factor in a military emergency for they provide a nucleus of highly trained officers and enlisted men who are ready at a moment's notice to direct their skills and training to the defense of the nation. All of the members of these units have had military training and all are highly skilled in civilian functions which are essential in wartime.

Electric Products Appoints Philadelphia Agents

The Electric Products Co., Cleveland, Ohio, has appointed K. I. Clisby Associates as district representatives for the eastern section of Pennsylvania, the southern counties of New Jersey, most of Maryland and the entire state of Delaware.

With offices in Philadelphia, Pa., K. I. Clisby Associates will be responsible for promoting The Electric Products Company line of synchronous and induction motors, A-C and D-C motors and generators, battery chargers, electrolytic power supplies and frequency changers.

The torchlight telegraph of Polybius

IT TOOK a "communications expert" plus two nimble operators to spell out a message on this unusual semaphore, used by the Greeks around 200 B.C.

Brainchild of an historian named Polybius, this system was limited to short distances. Nevertheless, it represented one of the first types of coded communication.

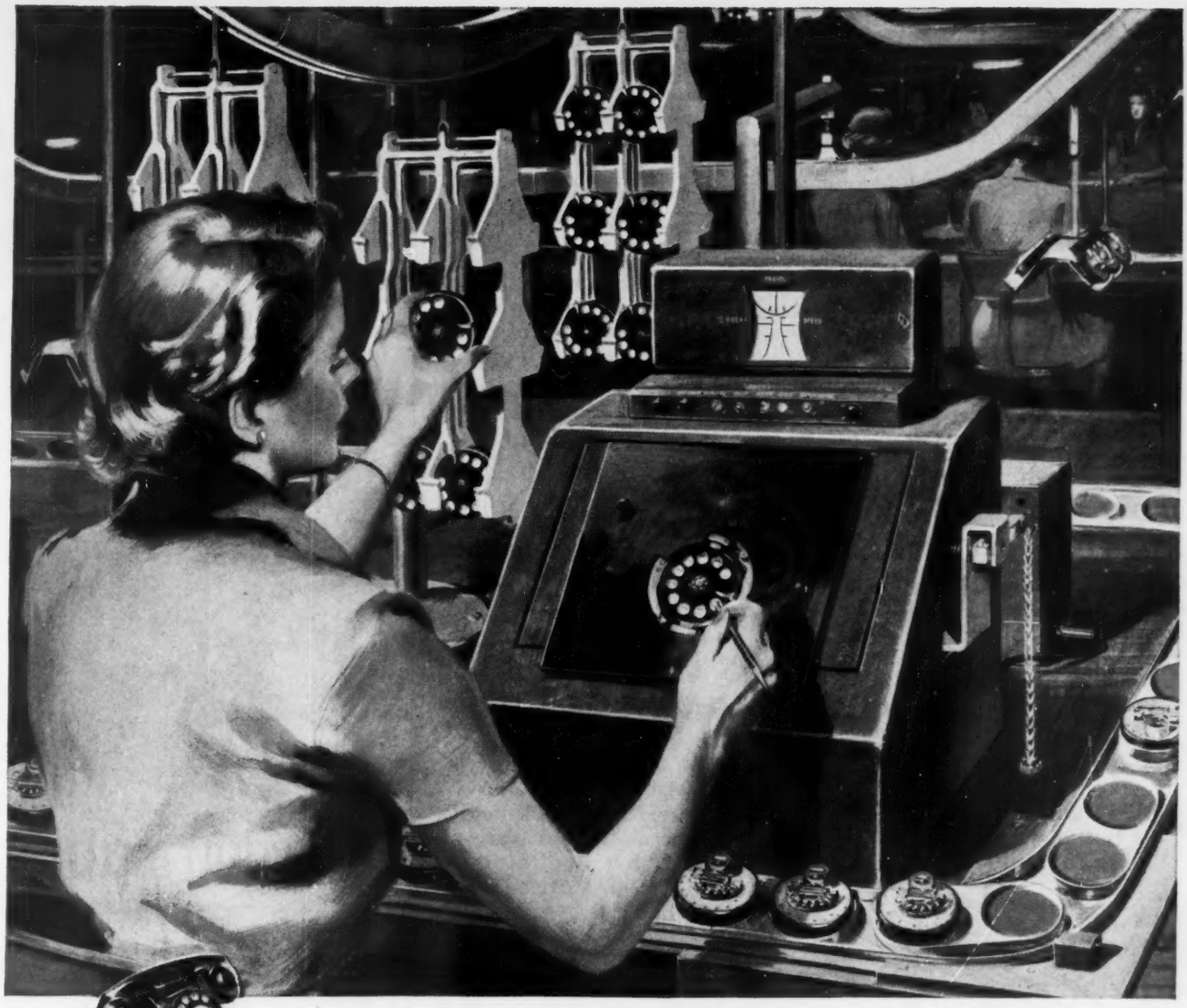
Nowadays, messages streak over distances unimaginable to the ancients. On guard over many telephone and telegraph lines are Hemingray Insulators, contributing greatly to overall efficiency.

Hemingray No. 56

★

This advertisement is one of the Hemingray series on the history of communication.

HEMINGRAY INSULATORS
American Structural Products Company
MUNCIE, INDIANA
Subsidiary of **Owens-Illinois Glass Company**



Final test for telephone dials

FAMILIAR MIRACLE... *in the making!*

GETTING the right number by simply twirling a dial is such a familiar miracle that millions of telephone users take it for granted. One reason why that's so is that telephone people take infinite care in the designing, manufacturing, testing and maintenance of the nation's telephone equipment.

Since the very beginning of the industry, Western Electric has had a leading part as a maker of good telephone equipment—the kind that helps to make good service possible.

Western Electric

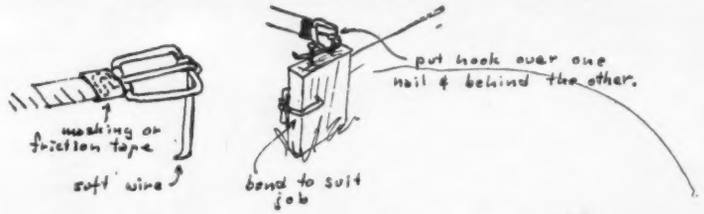
TELEPHONE APPARATUS AND CABLE

PRACTICAL TIME SAVERS

By Frank M. Butrick, Jr.

Alma, Mich.

SPEED UP THAT MEASURING JOB:—Here is an easy alteration which, when performed on a 50 or 100 foot tape, will stop the necessity of hunting up a helper when you want to do some measuring. Simply tape a piece of heavy but soft iron or bronze wire bent as shown on the end of the tape. The hook

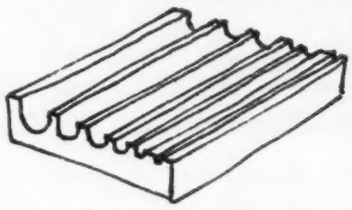


will hold in most materials, such as building corners, fences, sidewalk edges, etc. When measuring land, I carry 2 or 3 little wooden stakes with a couple of nails in the end. Driven into the ground with the foot, the tape hooks to them easily and they are loosened with a kick.

If the hook doesn't fit the measuring point on your object just right, bend it so it does.

• • •

DRILL PRESS ACCESSORY:—When drilling holes in thin-wall conduit or in copper tubing, frequently some difficulty is found when using standard "V"-blocks, as the pressure of the drill flattens the work somewhat, making it difficult to assemble joints, etc. Here is a simple drill press accessory which will do much to correct the situation.



Clamp two flat pieces of 2″ hardwood together in a vise or with C-clamps, and drill 5 or 6 holes with diameters equal to that of the most commonly used sizes of conduit or tubing. When the holes are completed, discard one block, or keep it for a spare, and use the other one as a V-block. With the work supported for half its circumference, there is much more rigidity in the set-up, no chance for the work to flatten or spring, and it is nearly impossible for the work to turn, especially if the holes are on the snug side, even when drilling holes off-center.

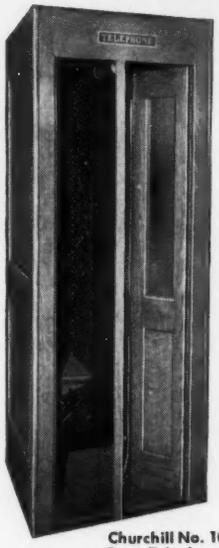
• • •

EASILY MADE DE-MAGNETIZER TESTER:—It is often necessary to test industrial de-magnetizers. This is sometimes difficult due to the fact that a low voltage condition will still allow the equipment to operate to a degree.

A ten-inch cardboard tube three inches in diameter is wound with three-hundred turns of #26 cotton covered copper wire. A bulb of six volt capacity is fastened in the end of the tube. One end of the coil is soldered to the center connection of the bulb. The other end is fastened to the thimble.

By inserting the tube into the magnetic field of the de-magnetizer the bulb will glow. The further the tube is inserted in the field, the brighter the bulb will glow. By marking the coil at the first glow point the machine may be tested quickly and easily without the use of other instruments.

STROMB



The Churchill No. 100 Folding Door Telephone Booth

churchill ventilated telephone booth

Attractive—available in two finishes to harmonize with any interior. Included as standard equipment are electric light and automatic electric ventilator.

Users appreciate the comfort and privacy of a Churchill telephone booth—operating companies find it profitable.

Constructed as a single unit and equipped with reinforced back panel for mounting a wall telephone or coin collector.

No. 100-A—Selected white oak, in light medium oak satin finish.

No. 100-B—Birch, mahogany finish.

Overall height is 84¾″; width, 30½″; depth, 30½″. Shipped knocked down and crated.

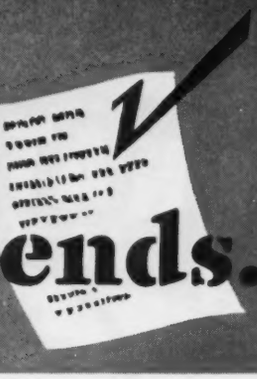
Illustrated literature available.

STROMBERG-CA

STROMBERG Telephone CARLSON

TELEPHONES, SWITCHBOARDS · SOU QUIPMENT

BERG-CARLSON recommends...



for rural lines with fog, rain, humidity—
hemingray insulators

(Left): Hemingray "No. 9." Made from only 9 oz. of glass, but with a maximum leakage path approaching standard long-distance design. Inner skirt surface well protected from rain-splash; long skirt protects pin itself.

(Right): Hemingray "No. 14." Its double-petticoat feature is useful wherever fog and humidity prevail. Production economy in design and lightness make its low cost attractive for rural telephone line budgets.

Manufactured by American Structural Products Company

for accurate and rapid wire stringing or checking USE the dillon dynamometer

There's no guessing or uncertainty when a scientific Dynamometer is used to check wire tensions. *Easy* to use, *easy* to read, dead accurate. Works on new leads going up or *old* leads long established. Hundreds of satisfied owners in telephone and power fields. Reasonably priced. Decide *now* to save time and money with this useful tool. Prices on request.

the new cane *seat is cooler - cleaner - more comfortable...*

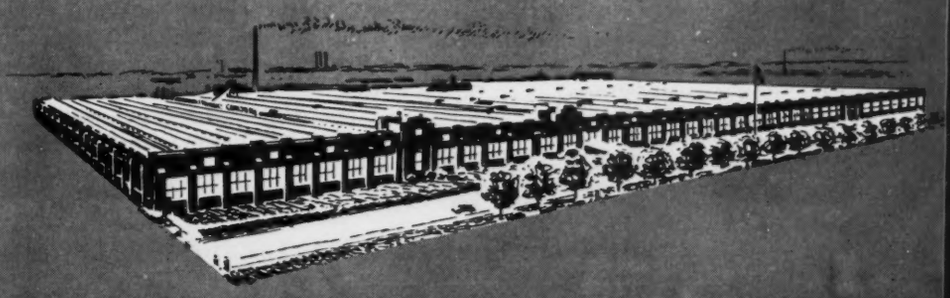
sturgis SC-240

Literally "by request"—this new operator's chair retains all the posture advantages for which Sturgis is famed and adds the cool, clean comfort of a *cane* seat. The posture-curved, well-cushioned back rest is covered in genuine leather.

The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.

Other new and welcome features include a plastic-coated steel foot ring which retains its color and a handy purse holder, available on request. Six seat heights, all adjustable.

G-CARLSON



Factory, General Offices: Rochester 3, N.Y.
Branch Offices: Atlanta 3, Chicago 6, Kansas City 8, San Francisco 3. In Canada: Stromberg-Carlson Co. Ltd., Toronto

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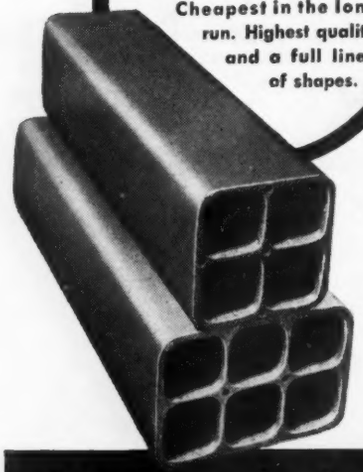
SINCE 1889
NATCO
CLAY CONDUIT

The proved and standard Protection for Underground Telephone Cables.
Cheapest in the long run. Highest quality and a full line of shapes.



National Fireproofing Corp.
327 FIFTH AVE.
PITTSBURGH 22, PA.

GUARD AGAINST
LOSSES FROM
POWER OUTAGES!

with an
ONAN STANDBY
ELECTRIC PLANT!

Hospitals, radio stations, theaters, hatcheries, telephone exchanges, and manufacturing plants are protected against losses and danger to life with Onan Standby Electric Plants. When power fails, these plants start automatically; supply regular 110-volt A.C. electricity; stop when service is restored. Powered by heavy-duty gasoline engines, Onan Electric Plants will operate continuously if necessary. Air-cooled: 1,000 to 3,000 watts, A.C. Water-cooled: 3,000 to 75,000 watts, A.C. (Diesel models from 2,500 to 75,000 watts also available for other purposes.)

Write for Free Folder

Onan PRODUCTS
D. W. ONAN & SONS INC.
5915 Royalston Ave., Minneapolis 5, Minn.

New Comptroller For Cannon Electric

Robert J. Cannon, president of the Cannon Electric Development Co., has announced the appointment of two new plant executives, a comptroller and a production manager, at Cannon's Los Angeles factory.

The new comptroller is Ray O. Hill, who replaces Anthony Slanga, resigned. John K. Trotter assumes the position of production manager formerly held by Richard L. Rowen, recently elected vice-president of Cannon Electric.

Ray O. Hill's background includes B.A. and M.A. degrees in Commercial Science from the University of Detroit. In addition, he studied law at the University of Baltimore, and became an accredited Certified Public Accountant in Maryland. He has lectured on accounting at the University of Baltimore, Johns Hopkins and Rutgers. His executive accounting positions include those with Agfa Ansco Co., General Analine Works, Porcelain Enamel & Mfg. Co., Bohn Refrigerator Co., and Philip B. Price, CPA firm of Detroit.

John K. Trotter brings to Cannon Electric a wide experience in industrial engineering, budgetary control, production planning, scheduling and cost systems through his work with Ebasco Services, Inc., and for such firms as Consolidated Vultee Aircraft, United Aircraft, Texas Eastern Transmission Corp., Sperry Gyroscope, and other corporations. Mr. Trotter received his B. A. degree from Vanderbilt University, an accounting degree from Pace Institute, and also an Industrial Engineering certificate from Columbia University.

Hirsch Organization Awarded Gov't. Contract

The Gustav Hirsch Organization, Inc., electrical contracting firm with headquarters at 310 W. Broad-st, Columbus, Ohio has been awarded a Government contract amounting to $7,374,000, the largest ever awarded the company and one of the largest ever handled in Central Ohio, it was announced by Milton Staub, vice president and general manager.

The contract calls for the construction of an electrical substation, a switchhouse and switch yard at Oak Ridge, Tenn., in connection with Atomic Energy Commission project K31. Work already has started.

The Hirsch firm has sublet the contract for the buildings to Traylor Brothers, Inc., of Evansville, Ind., for $1,179,000.

Just Published

INDUSTRIAL ELECTRONIC CONTROL

New Second Edition contains latest information on electronic control circuits and explains their practical applications in industry. Designed to give you a basic working knowledge of electronic control for selling installing and servicing electronic equipment, this book covers electron tubes, circuit components, basic electronic circuits, industrial electronic circuits, etc. Includes useful tables, charts, formulas, etc. By W. D. Cockrell, General Electric Company. 247 pages, $4.00

TRANSFORMER PRINCIPLES & PRACTICE

Here's a newly revised book for practical men who have to have a comprehensive, working knowledge of transformers. Explains in clear manner all aspects of transformer construction and use, including underlying principles, applications, connection, testing, care, and economics. Up-to-date information on current-limiting reactors is covered, as well as other timely material for utilizing, testing, and maintaining transformers. New Second Edition. By J. B. Gibbs, Westinghouse Electric Corp. 232 pages, $3.50

Order from
Telephone Engineer Pub. Corp.
7720 N. Sheridan Rd. Chicago 26, Ill.

HALF-HOURS WITH GREAT SCIENTISTS

The Story of Physics
by CHARLES G. FRASER
Head, Dept. of Physics, Harbord Collegiate Institute, Toronto
1948, 528 Pages, Illustrated, $6

Employing a historical and biographic approach to the study of physics, this new, big book, HALF HOURS WITH GREAT SCIENTISTS, provides a treasure-house of fascinating and useful information.

In this new book, you trace the stories of mechanics, acoustics, optics, thermics and electricity with source quotations, with abundant diagrams, sketches and half-tone illustrations, with biographical detail and humorous and illuminating anecdotes.

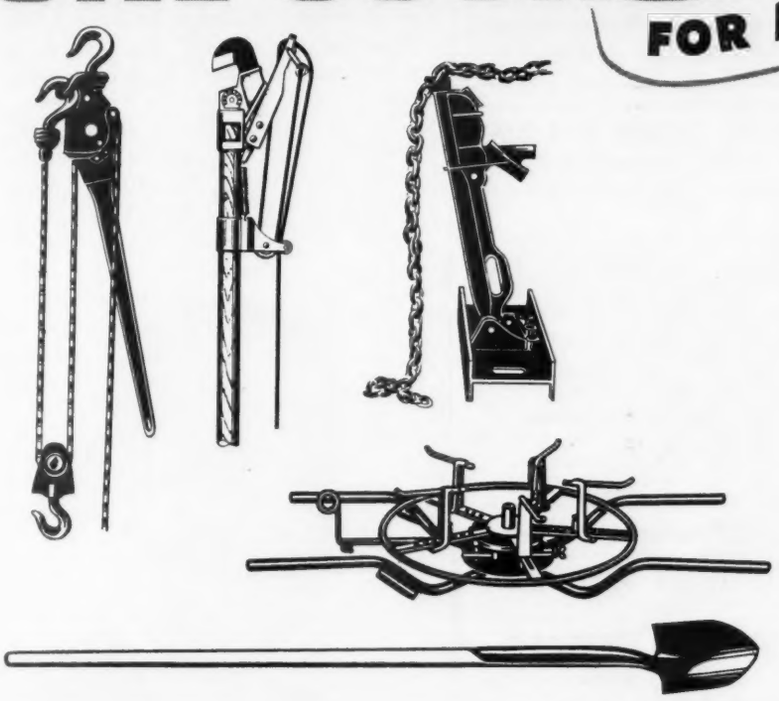
Dr. Fraser takes you back to prehistory, to the very beginnings of science, quoting the earliest comments, references and experiments. As the story develops, he lets each great discoverer tell, as far as possible in his own words, about epoch-making experiments or theories. You are given, too, the background of each discovery, how it was received by contemporaries and to what further development it led.

Whether you are a layman, student, teacher of science, chemist or physicist, you will find this book a valuable source of material and a fascinating and enjoyable treat.

Order from
TELEPHONE ENGINEER
7720 Sheridan Rd. Chicago 26, Ill.

ONE SOURCE

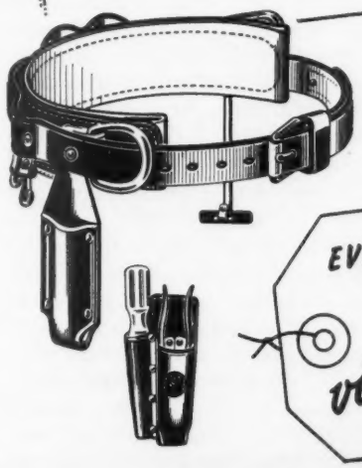
FOR ALL YOUR TOOLS



Why spend time shopping around for tools? From nearby Graybar you can fill all your requirements with just one order—and be sure you're getting dependable items. Graybar, pioneer supplier of tools and pole-line items to the independent telephone industry, has always selected only proven products of leading manufacturers who serve this industry.

Having all the right tools available when your linemen need them will increase job efficiency and avoid costly delays. Look over your tool inventory for shortages and antiquated or worn equipment—then check it against the following list of Graybar-distributed tools:

- blocks, snatch blocks, pulleys, jacks
- blowtorches, furnaces
- hoists, load binders, pole binders, tuggers
- ladders, rope
- line trucks, trailers, pole derricks, winches
- pole supports, pike poles
- peavies, cant hooks, carrying hooks
- pliers, screwdrivers, knives, wrenches, grips
- shovels, spoons, digging bars, tampers
- sleeve clamps and twisters, temporary guy clamps
- tool bags, belts, safety straps, tool pockets
- trimmers, lopping shears, saws
- wire reels
- hot-line tools: hinged universal tools, storm tools, insulated wire cutters, grounding sets
- safety equipment and first aid kits



EVERYTHING IN TELEPHONE SUPPLIES via **GraybaR**

Your local Graybar Representative, as an employee-owner is anxious to make your order his personal responsibility—he'll see that you get prompt deliveries. In addition, the experience of a Graybar Telephone Specialist is always available to help you solve any unusual technical problems.

Besides pole-line supplies, Graybar can provide everything you need for wiring, ventilating, or lighting your buildings—plus "intercom" systems to speed your office work. *Graybar Electric Company, Inc. Executive offices: Graybar Building, New York 17, N. Y.* 5042

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Experienced in REA Procedures
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Design and Construction Supervision

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Cable Splicing
Repairing
Cable Plant Construction
Aerial Spinning and
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Line Construction
Switchboard Repairing
All work Guaranteed
Wilton Electric and
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Andy Mueller
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Construction Work
Time Saving Equipment Used
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15 Years Experience in Construction and Maintenance Work
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HERMAN GEMAR Electric Service
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of all sizes
Installed - Modified - Removed
All Makes
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B. O. VANNORT ENGINEERS
Incorporated
Electrical—Civil—Mechanical
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A complete engineering service
700 South College Street, Charlotte, N. C.

EQUIPMENT INSTALLATION
Any Type
Manual or Dial
All Work Guaranteed
Reasonable Rates
Telephone Installation Services
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Joe C. Vandine Jackson 6629

Harris-McBurney Co. *Electrical Engineers*
A complete construction service for the telephone industry
Appraisals—Reports
297 W. Mich. Ave., Jackson, Mich.
Telephone 7931

Telephone Repair & Supply Enlarges Sales Staff

Daniel H. McNulty, president of the Telephone Repair and Supply Co., Chicago, recently announced the appointment of M. Parke Chatfield as sales engineer, to head Sales Department activities. An intensified advertising program, in addition to regular trade publication advertising, is being formulated. A direct mail monthly sales letter featuring timely values has already appeared. To be released this month is a new catalog listing Dan Mac new and rebuilt

M. PARKE CHATFIELD

products and a full line of materials and supplies. Ample binding space will be provided to allow additional sheets and the monthly sales letter to be easily inserted. This will provide the telephone field a catalog that is corrected or added to monthly. A feature that should prove popular in view of today's uncertain prices.

Mr. Chatfield is well qualified for this position by virtue of his diversified service in our industry. Joining the Automatic Electric Co. in 1928. upon completion of electrical studies at Onarga Military Academy, he progressed from the A. E. Co. training school through several years of field installation and service sales to the Chicago Sales Department.

In 1942, after a year with the Indiana Associated Telephone Corporation's Lafayette and La Porte exchanges, Chatfield entered the Army Signal Corps. As civilian wire chief and chief switchman at the vitally important Aberdeen Proving Grounds installation he was presented with the Civilian Meritorious Service Award for outstanding performance of duty. At the close of the War he

transferred to Ballistic Research Laboratories whereupon he was sent to the Bell Telephone Laboratories in New York City. Here he assisted in the construction and testing of the Stibitz-Bell all relay Computers, prior to their acceptance by B.R.L. He resigned as Chief of Maintenance and Engineering in charge of this unit to assume his present position.

Mr. Chatfield will, in addition to advertising and sales promotional activities throughout the country, represent the Telephone Repair and Supply Co. at many of the conventions as well as directly in the Middlewestern States.

He is a member of the Army Ordnance Association and social member of The American Legion, Aberdeen Maryland Post No. 128 where he formed and was Executive Director of their Boys' Club. His hobbies are working with the youths of his community and model railroading. He is married and the father of a son and daughter.

Onan Issues New Standby Folder

"When Power's Off . . . You're Safe!" is the title of a small but interesting new folder recently issued by D. W. Onan & Sons Inc., Minneapolis, Minnesota, manufacturers of electric generating plants.

The folder tells how any business, factory, institution, farm or home can be protected against property damage, production losses and danger to human life which are the frequent results of electric power failures.

A full page of illustrations shows a number of institutions and business establishments which are protected 24 hours a day with Onan Standby Installations. These include hospitals, hatcheries, theaters, radio stations and greenhouses which are particularly vulnerable to electric power outages.

The new Onan Standby Generator, especially designed for tractor-belt drive, is described and illustrated in the folder. For full particulars, write for Standby Folder, A-277.

National Battery Co. Changes Name

Gould-National Batteries, Inc., became the new name of the National Battery Co. on August 1 when the stockholders of the latter firm approved the change proposed by the board of directors.

The same sales and field engineering organizations, which have been serving heavy industry, mining, the railroads and the telephone companies under the name of the Gould Storage Battery Corp. will now operate under the new name of Gould-National Batteries, Inc. Sales and field engineering headquarters for this group will continue to be located in Trenton, N. J.

The policies, management and operation of Gould-National Batteries, Inc., will remain the same as those followed heretofore by Gould and by National.

National Battery Co. entered the industrial storage battery field through the purchase of the Gould Storage Battery Co., which was founded in 1898. The position of National in the industrial battery field was materially strengthened by the purchase, in June 1947, of the equipment and industrial battery business of Philco Corporation, with a plant located in Trenton, New Jersey.

M. W. Heinritz, formerly vice president of Gould Storage Battery Corp., was elected vice president in charge of industrial sales of Gould-National Batteries, Inc., at the annual meeting of the company held in St. Paul.

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Suitable for Lead in Wire, Drop Wire and Inside Wiring

1B110B-2, two conductor, 7 strand, (4 steel, 3 copper) twisted pair, with marker on one conductor; strand may be either parallel or concentric lay; approximately 1 mile per reel. Made by nationally known manufacturers.

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Weight per reel 164 lbs.
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ACT NOW — QUANTITY LIMITED
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25 1-mile reels ....$6.50 per reel 100 1-mile reels ....$6.00 per reel
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Kellogg Desk Stands, No. 118 or No. 34 type, complete with cords, like new, at $5.00 each.

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Kellogg Bakelite Shells & Caps, at $.60 each.

Kellogg Receiver Units only, No. 41 type, at $.35 each.

Transmitter, Kellogg No. 22, at $1.25 each.

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HELP WANTED: Man experienced in selling to telephone companies to travel in the midwest representing telephone equipment supplier. Salary and profit incentive. Write giving age, experience and when can be available. Replies will be kept confidential. Write Box No. 8671 c/o Telephone Engineer.

HELP WANTED: Experienced combinationmen and linemen. Permanent positions with good working conditions and employee benefits to those who qualify. Apply Nebraska Continental Telephone Company, Columbus, Nebraska, giving age, marital status and details of previous experience.

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HELP WANTED: We need man with experience in rebuilding magneto and PBX switchboards. Telephone Repair & Supply Co., 1760 N. Lunt Ave., Chicago 26, Illinois.

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WANTED TO BUY: One position of Kellogg Masterbuilt Universal toll switchboard, to add to 3-position, 1200 line board. Write Box No. 8689 c/o Telephone Engineer.

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FOR SALE: Magneto 5 Bar 1600 compact wall phones with rebuilt transmitter and receiver. Serviceable condition and tested before shipment. $10.00, F.O.B., Chicago. Write or call Clark-Jarvis Telephone Equipment Co., 7367-69 North Clark St., Chicago 26, Ill.

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Showing the up-right cloth in action.

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FOR SALE: Telephone exchange in central Missouri. 660 Stations. Common battery equipment, good construction and rates. Long terms to responsible and experienced party. Write Box No. 8687 c/o Telephone Engineer.

FOR SALE: Entire stock in Magneto exchange located in Northeast Kansas. 1949 gross after Bell commission $11,000. Selling price less than twice that amount. Box No. 8681 c/o Telephone Engineer.

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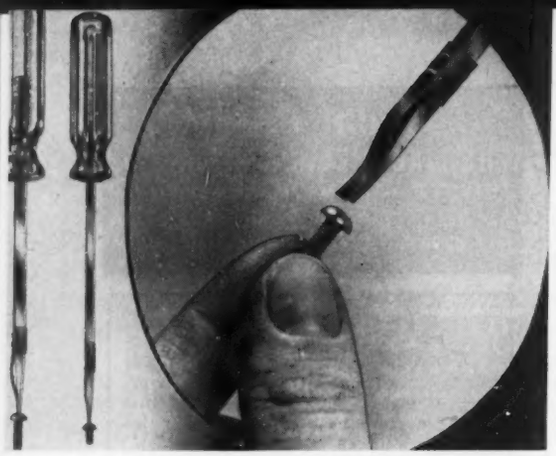


NEW SCREW DRIVER — Called the *"Vaco Klipxon"*, this screw driver is equipped with a sturdy, cleverly designed screw-holder in the form of a spring clip which may be slid back up the shaft and out of the way when not needed. —*Check New Product 252.*

ELECTRIC TORCH—New *Thermal-Jet Flameless Electric Torch* "supplies all of the heat necessary for 95% of all ordinary flame torch purposes," according to the *Kinetic Corp.* The new model has a 1-piece aluminum jacket with 3" orifice, a high-speed, heavy duty, replaceable electric unit, and a pistol grip handle.—*Check New Product 253.*

ACETYLENE EQUIPMENT — "Prest-O-Lite" No. 1 Lineman's outfit helps you do a better job, quicker & easier. The Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y. —[ADV 1]

ADVERTISING, Directories—General Telephone Directory Co., 604 Pine Ave., Long Beach, Cal., and 185 N. Wabash, Chicago, Ill.—[ADV. 2]

ANCHORS, Plastic Expanding, Universal. All Purpose—Mount in any Material, Holub Industries, Inc., 424 DeKalb Ave., Sycamore, Ill.—[ADV. 3]

ANCHORS & WIRE CONNECTORS—Matthews Scrulix Anchors, Matthews Telephone Wire Connectors. Write for bulletins. W. N. Matthews Corp., St. Louis 16, Mo.—[ADV. 4]

AUGER—The "Alaska Frost Auger." Free trial on your own machines. Henning Electric Motor Co., P. O. Box 786, Fargo, N. D.—[ADV. 5]

BATTERIES, Dry Cell—The Ray-O-Vac Company, 2317 Winnebago St., Madison, Wisc.—[ADV. 6]

BATTERY—WATER UNITS Demineralizers for Tap Water—A. E. Tomkin & Co., 1828 Columbia Rd., N.W., Washington 9, D. C.—[ADV. 7]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.—[ADV. 8]

BLOCKS, AERIAL CABLE—"Tug-O-Wheel" aerial cable blocks for safe and speedy installation of all types of aerial cable. Tug-O-Wheel Products Co., Ballston Spa, N. Y.—[ADV. 9]

BOOTHS—Acoustic Telephone—Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn 6, N. Y.—[ADV. 10]

BOOTHS—Churchill Cabinet Co., 2119 Churchill St., Chicago 47, Ill.—[ADV. 11]

CABLE, All Plastic, Aerial, Duct, Direct Burial, PBX, Switchboard.—The Ansonia Electrical Co., Ansonia, Conn.—[ADV. 12]

CABLE SPINNING—The Cable Spinning Equipment Company, 432 Crane St., Topeka, Kans.—[ADV. 13]

CARRIER EQUIPMENT—Adler Telephone & Telegraph Carrier Equipment has been standard for twenty years in the Independent Field. Mfd. only by Southern Electric & Transmission Co., 3127 Holmes St., Dallas, Texas.—[ADV. 14]

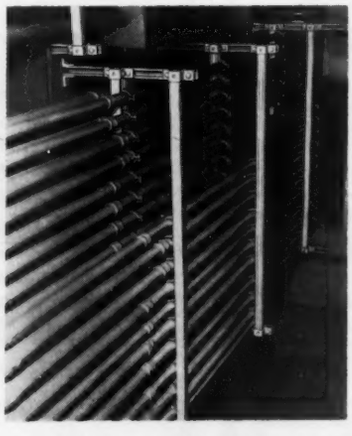
CONNECTORS, CABLE—Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—[ADV. 15]

CORDS, Instrument and Operators—Commercial Cord & Supply Co., 26 Main St., Clifton Springs, N. Y.—[ADV. 16]

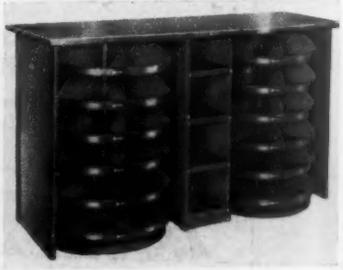
CORDS, Switchboard & Telephone—Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.—[ADV. 17]

WOOD BORING BITS — New, *Greenlee Tool Co.*, wood-boring bits are for use in ¼-inch portable electric drills and have been specially developed for boring ½-inch or smaller holes in soft or hard wood. Bits are of solid-center design and have the single-cutter, extension-lip type head. —*Check New Product 254.*

"AMPROBE" VOLT AMMETER—New instrument manufactured by *Pyramid Instrument Corp.* is built to measure current without interrupting service. The "Amprobe" features two insulated split-core transformer probes which are opened by a plastic finger trigger to close conductors up to 1⅛ inches in diameter.—*Check New Product 255.*



FRAMING STRUCTURE—Manufactured by Unistrut Products Co., *"Unistrut"* metal framing is completely adjustable; permits fast framing assembly. In an installation of type shown above, stock lengths of *"Unistrut"* channel are cut to correct measurement right on the job and quickly assembled.—*Check New Product 256.*



"ROTABIN"—Designed to increase the availability of storage space under counters, the new *F-G-M Rotabin Counter*, manufactured by the *Frick-Gallagher Mfg. Co.*, provides aisle access to 72 large compartments in 12 28" diameter independently rotating trays. Built entirely of steel, the counter is strong and rugged, will stand up under hard usage. The counter top is formed from a single heavy gauge sheet. Center shelf section is bolted in place. The two Rotabin units are each supported on a heavy gauge formed base.—*Check New Product 257.*

CROSS ARMS—American Cross-Arm, Inc., 141 W. Jackson Boulevard, Chicago, Ill.—[ADV. 18]

DERRICKS—Set more poles with aluminum derricks. Aluminum Co. of America, 1407C Gulf Bldg., Pittsburgh 19, Pa.—[ADV. 19]

"EARTH BORING MACHINES" Sterling Model "A"—Precision Engineered and Hydraulic Controlled. Sterling Engineering & Mfg. Co., 173 Gilligan St., Wilkes-Barre, Pa.—[ADV. 20]

ELECTRIC HOT WATER HEATERS, Thermostatically controlled for any hot water heater, Vulcan Electric Co., Danvers 17, Mass.—[ADV. 21]

ENGINEERING, Construction—Neale Construction Company, 432 Crane St., Topeka, Kans.—[ADV. 22]

FLASH LIGHTS, Carpenter Mfg. Co., 222 Master-Light Bldg., Boston 45, Somerville, Mass.—[ADV. 23]

FLOOR DUCT—The Versatile Floor Duct, Ask your jobber or write, Winders & Geist, Inc., P.O. Box 633, Lincoln, Neb.—[ADV. 24]

GENERATORS—A. C. power anywhere with "Katolight" plants and generators. Kato Engineering Co., 131 Maxfield Ave., Mankato, Minn.—[ADV. 25]

FURNACES—For quickly and economically melting lead and paraffin—Mutual Liquid Gas Equipment Co., Inc., 3600 W. Imperial Highway, Los Angeles, Calif.—[ADV. 26]

GLOVES—The Saranac Buckskin Linemen's Gauntlet made especially for linemen. Write for information, Saranac Glove Co., Littleton, New Hampshire.—[ADV. 27]

INSULATORS, Porcelain—Porcelain Products, Inc., Box 300, Findlay, Ohio.—[ADV. 28]

JACKS, for lifting Cable Reels, Pulling Poles and Maintenance Work. Duff-Norton Mfg. Co., 1710 Preble Ave., Pittsburgh 12, Pa.—[ADV. 31]

LANTERNS, WARNING—"Little Air Pilot," the general purpose warning light. Embury Manufacturing Co., 210 Allen St., Warsaw, N. Y.—[ADV. 29]

LIGHTWEIGHT PULLERS—Coffing Hoist Company, 800 Walters St., Danville 5, Ill.—[ADV. 30]

MAILING SERVICE FOR MANUFACTURERS—We will address and mail your direct-mail sales pieces to every telephone company in the United States. Telephone Engineer Publishing Corp., 7720 Sheridan Road, Chicago 26, Ill.

PIPE PUSHERS—Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa.—[ADV. 32]

PIPE PUSHERS—Greenlee Tool Co., 2136 12 St., Rockford, Ill.—[ADV. 33]

PINS & BRACKETS—Mfrs of all sizes of Locust Pins and Oak Brackets , The Locust Pin Co., Inc., Front Royal, Va.—[ADV. 34]

PLUGS for the Telephone Industry. Write for Cannon Electric Condensed Catalog. Cannon Electric Co., 3209 Humboldt St., Los Angeles 31, Calif.—[ADV. 35]

POLE HOLE DIGGERS—For derrick mounted trucks Tel-E-Lect Products, Inc., 10009 Minnetonka Blvd., Minneapolis 16, Minn.—[ADV. 36]

POLES—Cedar poles and Fir cross arms. R. G. Haley & Co., Inc., Spitzer Bldg., Toledo 4, Ohio.—[ADV. 37]

POLES, Contract Inspection & Preservative Ground Line Treatment—Osmose Wood Preserving Co., 1443 Bailey Ave., Buffalo 12, N. Y.—[ADV. 38]

POLES, Southern Yellow Pine—Colfax Lumber & Creosoting Co., Inc., P.O. Box 23, Pineville, La.—[ADV. 39]

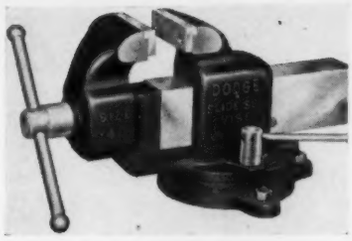
POLES, Telephone. "It pays to buy quality" International Creosoting & Construction Company. Galveston—Beaumont—Texarkana.—[ADV. 40]

POLES, Creosoted Southern Yellow Pine and Douglas Fir. The Long-Bell Lumber Company, Wood Preserving Div., R. A. Long Bldg., Kansas City, Mo.—[ADV. 41]

POLES, Southern Yellow Pine—Taylor Colquitt Company, 290 E. Main St., Spartanburgh, S. C.—[ADV. 42]

POLES, Southern Yellow Pine—Texas Creosoting Co., Orange, Texas.—[ADV. 43]

POLES—Texas Best pressure-creosoted poles. Lone Star Creosoting Co., P. O. Box 9, Longview, Texas.—[ADV. 44]



SLIDE-SET VISE—New quick action, machinists vise, embodying a patented fast slide action, has been announced by the *Dodge Manufacturing Corp.* The manufacturer claims the Dodge Slide-Set Vise, opens or closes to any position in one second through a push-pull action which eliminates spinning the handle.—*Check New Product 258.*

POLES—Western Red Cedar, Western Larch, Lodgepole Pine. B. J. Carney & Co., Minneapolis 3, Minn. and Spokane 8, Wash.—[ADV. 45]

POLES & CROSS ARMS—Creosoted poles and crossarms. Conroe Creosoting Co., Conroe, Texas.—[ADV. 46]

POLE LINE HARDWARE—Manufactured and stocked on the Pacific Coast by KORTICK MANFACTURING COMPANY, 345 First St., San Francisco 5, Calif.—[ADV. 47]

POWER UNITS—Insure against Power Failure with a "U.S." Stand-by Unit. Write for information. United States Motors Corp., 558 Neb. St., Oshkosh, Wis.—[ADV. 48]

PROTECTIVE EQUIPMENT—Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.—[ADV. 49]

GAS-TITE CABLE TERMINALS—Sub station protectors, main dist. frames; central office protectors; interior junction boxes; lightning arrestors.—Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—[ADV. 50]

PRINTING—Telephone forms. Cullom & Ghertner Co., 600 21st Ave., Nashville 4, Tenn.—[ADV. 51]

RADIO—Two-way radio systems. Motorola, 4545 W. Augusta Blvd., Chicago 51, Ill.—[ADV. 52]

REBUILT TELEPHONE EQUIPMENT—USED EQUIPMENT BOUGHT AND SOLD—Independent Telephone Repair Co., 2137 W. 21st St., Chicago 8, Ill.—[ADV. 53]

REBUILT TELEPHONE & SWITCHBOARDS—Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 2, Ill.—[ADV. 54]

SOLDERING IRONS, Electric—Vulcan Electric Company, Danvers 17, Mass.—[ADV. 55]

SUPPLIES—New all metal heavy duty extension loud ringers; ready wire reels, payout only and payout and takeup in one.—Suttle Equipment Co., Lawrenceville, Ill.—[ADV. 56]

TELERING—Telephone ringing by frequency conversion. Voltage range for all purposes, central office and private branch exchanges. Telkor, Box 186, Elyria, Ohio.—[ADV. 57]

SWITCHBOARDS, TELEPHONES, ETC.—Automatic Electric Co., 1033 W. Van Buren St., Chicago, Ill.—[ADV. 58]

SWITCHBOARDS, TELEPHONES, Etc.—The North Electric Manufacturing Company, Galion, Ohio.—[ADV. 59]

TREE EXPERTS—Davey Tree Expert Co., Kent, Ohio.—[ADV. 60]

TREE TRIMMERS—Seymour Smith & Son, Inc., Oakville, Conn.—[ADV. 61]

TRUCK BODIES—Highway Trailer Co., Edgerton, Wisc.—[ADV. 62]

TRUCK BODIES AND EQUIPMENT—McCabe Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.—[ADV. 63]

TRUCKS—Heavy Duty Engineered To Save You Money"—International Harvester Co., Chicago, Ill.—[ADV. 64]

WIRE DROP & INSIDE—Jackets of neoprene, rubber or plastic. Lowell Insulated Wire Co., Lowell, Mass.—[ADV. 65]

WIRE, FIELD TELEPHONE—Sugarman Equipment Co., 420 E. 8th St., Los Angeles Calif.—[ADV. 66]

WIRE, Insulated—DATED DROP WIRE—Neoprene or Weatherproof—Alphaduct Wire & Cable Co., Milltown, N. J.—[ADV. 67]

WIRE, Insulated Drop and Bronze or Copperweld—Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.—[ADV. 68]

WIRE, Insulated Drop, Genuine Ironite—Paragon Electric Co., Two Rivers, Wis.—[ADV. 69]

WIRE, Insulated Drop, HT Bronze, Paraprene or Braid Insulation—Paragon Electric Co., Two Rivers, Wisc.—[ADV. 70]

WIRE, TELEPHONE, for all inside and outside uses—Whitney Blake Company, New Haven 14, Conn.—[ADV. 71]

WIRE CUTTERS—H. K. Porter. Inc., 74 Foley, Somerville, Mass.—[ADV. 72]

WIRE REELS, Saves time and trouble in paying out wire. Send for literature, Hykon Mfg. Co., Alliance, Ohio—[ADV. 73]

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NEW PRODUCTS

NP 252..... NP 253..... NP 254..... NP 255..... NP 256..... NP 257..... NP 258.....

SERVICES AND SUPPLIES

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ADV. 7.....	ADV. 8.....	ADV. 9.....	ADV. 10.....	ADV. 11.....	ADV. 12.....
ADV. 13.....	ADV. 14.....	ADV. 15.....	ADV. 16.....	ADV. 17.....	ADV. 18.....
ADV. 19.....	ADV. 20.....	ADV. 21.....	ADV. 22.....	ADV. 23.....	ADV. 24.....
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Otto Bernz Introduces New Gas Torch

The Otto Bernz Co., Inc., Rochester, N. Y., has announced the new "Otto Bernz LP (Liquefied Petroleum) Gas Torch" is the "only completely portable, instant lighting, cylinder refill hand torch that burns in both cold or warm temperatures." The torch is equipped with interchangeable burners designed to suit special needs.

According to the manufacturer, the "Pencil Flame Burner" produces a fine, intensely hot flame that is instantly adjustable from pinpoint size up to a 2" length inner cone. The Utility Burner gives an intensely hot brush type flame adjustable from 2" to 4". The calculated flame temperature for both burners is 3660° F.

Bernz "LP" Gas Torch is widely used in variety of jobs. Above photo shows torch being used thawing frozen water pipe.

Bernz gas torch is handy helper in garage. Above photo shows torch used to solder radiator.

Torch in above photo is being used for silver soldering.

Copper sweat-fitting job is easily performed with Bernz Gas Torch.

Other features of the torch include:

(1) When the cylinder of fuel is empty, it takes only a few seconds to unscrew the burner from the cylinder

and exchange it for a completely filled one. The cylinders (ICC-4B240) approved) are available at leading dealers and jobbers.

(2) The instant lighting torch requires no pumping or pre-heating, and gives a clean, hot, economical flame.

(3) Fully loaded the cylinder weighs less than 2½ lbs.

(4) The compact, light weight, torch is completely portable.

(5) The torch burns in any position, including upside down.

The torch is designed to operate with propane fuel. According to the manufacturer, one "cylinder refill" of fuel will economically operate the torch for 12 hours or more, depending on the size flame used.

Further information may be obtained by writing the manufacturer, The Otto Bernz Co., Inc., 280 Lyell Avenue, Rochester 6, N. Y.

Benjamin Olney Retires From Stromberg Carlson

Benjamin Olney, Director of Research of the Stromberg-Carlson Company, Rochester, New York, since 1937, retired on August 30th, the 30th anniversary of his employment by the company.

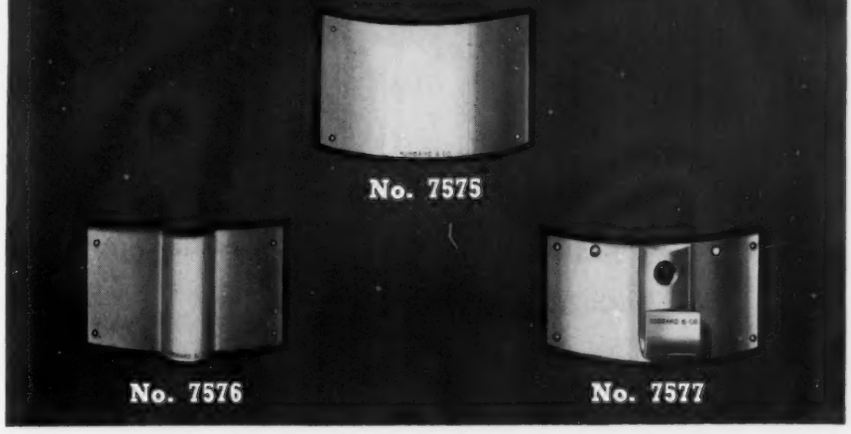
Born in Wayland, N. Y., Mr. Olney entered the telephone business there while still attending high school. After two years of switchboard installation work for a Buffalo firm he joined the Ingersoll Telephone Co., Ingersoll, Ontario, where he was plant chief at the time he resigned in 1920 to take charge of Stromberg-Carlson's Electrical Laboratory.

With the advent of radio broadcasting he became greatly interested

(*Please turn to page* 100)

BENJAMIN OLNEY

HANG THE LOAD ON



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in the then neglected science of acoustics, and was appointed engineer-in-charge of the Acoustical Laboratory upon its founding in 1926.

In the expansion of the company's activities, Mr. Olney became Director of Research in 1937. He is a Fellow and Charter Member of the Acoustical Society of America and was Vice President of that Society in 1948-1949. He is a Licensed Professional Engineer, and received the Modern Pioneer Award in 1940. He has had several patents in acoustics and electronics issued to him and has published numerous articles in "*Electronics*," in the "*Proceedings of the Institute of Radio Engineers*" and the "*Journal of the Acoustical Society of America.*"

Stromberg-Carlson President Robert C. Tait was principal speaker at a dinner in Olney's honor held at the Locust Hill Country Club on August 23rd. Lynn C. Holmes, who will succeed Mr. Olney as Director of Research, presided as toastmaster. Appropriate gifts were presented and excerpts from letters were read, received from about a dozen "Alumni" of Stromberg-Carlson's Research Laboratory, associates of Mr. Olney over a long period of years including the important period of World War II. Mr. Olney expects to continue his professional interests as a Consulting Acoustical Engineer specializing in noise reduction and in the acoustical design of buildings.

C. M. Shaw Named Finance Manager for Koppers

C. M. Shaw, assistant treasurer of the Wood Preserving Division of Koppers Co., Inc., has been named manager of the Division's Finance Department, H. R. Condon, vice president and division general manger, announced recently.

Mr. Shaw's appointment follows the retirement of L. S. Graham, former manager of the Finance Department.

A native of Fanin County, Texas, Mr. Shaw attended the Texarkana public schools and Texarkana Business College. From 1916 to 1923 he was associated with the Missouri Pacific Railroad in clerical and accounting activities.

Mr. Shaw joined Koppers in 1923, and from 1937 to 1946 supervised accounting for the Wood Preserving Division. He was named assistant Treasurer of the Division in 1946 and coordinated accounting between the central office in Pittsburgh and the Division's 22 wood treating plants.

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The Back of The Book

By JOHN G. REYNOLDS

"In the Middle Of The Night" . . . We have often commented on operators and their ability to handle any emergency. And here's another story from Coalinga, Calif., that proves what a loyal group of operators we have at the switchboards in this country.

You probably remember the recent B-29 plane crash and explosion at the **Fairfield-Suisun (Calif.)** Air Base. Not many papers mentioned it, but immediately after the disaster telephone operators began volunteering for duty at the Suisun Central Office to handle the zooming volume of telephone calls. Realizing that their services would be needed, girls who had gone home after their day tricks began hurrying to the office and within an hour a force of 18 operators was on duty and about half of the girls came in their **night gowns** to handle the local and long distance calls that flooded the switchboards throughout the night . . . . The gals may have been sleepy but the job they did deserves an orchid.

• • •

"Telephone Happy" . . . Straight from **Pete Ferguson's** territory in Mankato, Minn., comes a woman who has admitted in court that she telephoned the sheriff at least 630 times in three weeks to give him the **Bronx Cheer.** The admission came after the **Mankato Citizens Telephone Co.** had spent $108.50 to trace the calls.

In court, the avid telephone user testified she called the sheriff at least 30 times a day but couldn't tell why. She said she bore no grudge against him, but **just couldn't resist the telephone.**

"Her conversations were vivid and to the point," the sheriff said, **"and then she just puckered her lips and let loose with a juicy Bronx Cheer."** . . . We understand things are now quiet in Mankato . . . The sheriff gets a good night's sleep . . . The woman has no telephone and **Pete's company** will get back its $108.50.

• • •

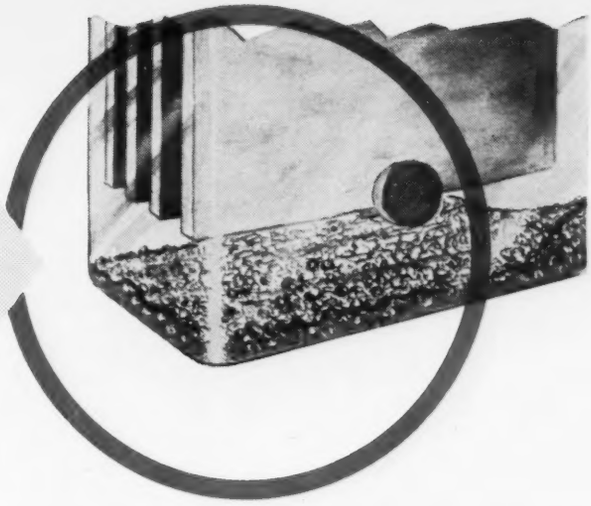
Fund Raiser . . . As secretary of the **Sorum (S. D.) Telephone Co., Charles Laflin** has faced some tough problems and whipped **"the socks off them."** When faced with the job of raising funds for metallicizing lines, **Charlie** let his subscribers know of the problem . . . "We need more money," **Charlie** reported to his subscribers. "You may say it's the same old cry —however, we honestly think that each and every one that helps to get your doctor, get swift action to put out the prairie fire, or any other emergency, will feel that the dollar advanced to get this agency, the telephone, swiftly and quietly at work, is well, well spent . . . You and I wish with all our hearts that our telephone lines could be quieter and right now, we also know that time, work and money only will do it. With this thought in mind, we have been calling on you for contributions, large or small, selling you stock and otherwise asking favors of you. You have been both patient and kind. . . ."

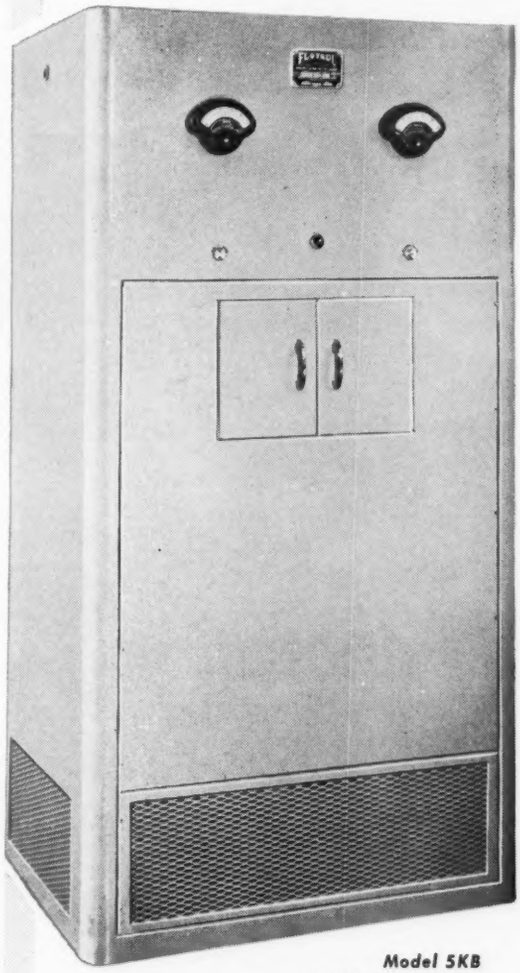
Such a plea literally started the subscribers working for the telephone company . . . The Legion boys let the company have its hall free of charge for a "fund raising" dance . . . The members of the dance orchestra furnished the old-time dance music free of charge . . . The supper committee donated both time and effort to help make everything a success, and everyone had a pleasant evening.

And now it looks as though **Charlie's** subscribers soon will have better service—and money and the good will that came with it have helped Charlie get a job done.

LOOK

AT THE BOTTOM OF YOUR STORAGE CELLS





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